AN INVESTIGATION

OF THE

ROTATION PERIOD OF THE SUN

BY SPECTROSCOPIC METHODS

BY

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WASHINGTON, D. C.
PUBLISHED BY THE CARNEGIE INSTITUTION OF WASHINGTON
1911

CARNEGIE INSTITUTION OF WASHINGTON

PUBLICATION No. 138

PAPERS OF THE MOUNT WILSON SOLAR OBSERVATORY, VOL. I, PART I

GEORGE E. HALE, Director

Norwood Press
J. S. Cushing Co. — Berwick & Smith Co.
Norwood, Mass., U. S. A.

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INTRODUCTION.

One of the earliest of the applications of the Doppler-Fizeau principle in astrophysics was to the problem of the rotation of the sun. The detection of the minute displacements of the spectrum lines at the sun's limb by Vogel in 1871 (1)* not only furnished an invaluable proof of the validity of the principle, but also indicated the possibility of obtaining, with the aid of more powerful apparatus, a measure of the rate of rotation by an independent method free from many of the difficulties possessed by such methods as depend upon direct observations of the solar surface. The invention of the diffraction grating made it possible to apply to the study of the solar spectrum spectroscopes of much greater power than any previously available, and with its aid Young in 1876 (2) was able to measure the displacements of the spectrum lines at the sun's equator with a considerable degree of accuracy, and to show that the results so obtained were in satisfactory agreement with those derived from observations of the sun-spots. Shortly after, Langley (3) and Cornu (4) made an interesting application of the principle by showing how lines due to the earth's atmosphere may at once be distinguished from those of solar origin by their freedom from displacement when the spectra of the opposite edges of the sun are observed simultaneously.

In 1888 Dunér began at Upsala his celebrated investigation of the rotation of the sun (5). This work, continued throughout 1889 and 1890 and repeated in the years 1901 to 1903, is without doubt the standard of reference among those who have since undertaken the study of this problem. Dunér in this investigation made use of the suggestion by Langley already mentioned, and by employing atmospheric lines as his standards of reference was enabled to make all of his measures differential, and so to attain an extraordinarily high degree of precision. His determinations are grouped about points separated by intervals of 15° between the solar equator and 75° of heliographic latitude, a point far beyond the limit reached in sun-spot observations. With the aid of these results he was able to discuss exhaustively the validity of the various formulæ connecting the rotation period with the latitude proposed by Carrington, Faye, and Spoerer as the result of their observations of sun-spots between the equator and 45° of latitude. From this discussion he concluded that Faye's formula most closely represented his independent observations in the higher latitudes. Many references will be made to this memoir of Dunér in the following pages.

Following Dunér's earlier work some photographic observations were made by Jewell at Baltimore (6), but no details of the results obtained by him have been published. In 1887 Crew (7) also took up the problem and obtained a series of values differing widely from those of Dunér. It seems probable that some source of systematic error was present in these observations, a possible cause, as Crew himself suggested, being that arising from displacements of the slit due to heating by the sun's image.

The most recent investigation was that made by Halm at Edinburgh (8) during the years 1903 to 1906, and led to results of the highest accuracy and importance. Like Dunér, Halm made use of the differential method, and since the lines employed by him are the same as those of Dunér, the two series of results are strictly comparable. In two essential features the instruments used by Halm differ from those of most previous investigators. The first was in the use of a heliometer to form the solar image, it being possible by movement of the divided object-glass to pass rapidly from one extremity of the solar diameter to the other. The second was in the employment of a fixed horizontal spectroscope in place of an instrument attached to an equatorial telescope and moving with it. The advantages of such a type of spectroscope can hardly be questioned, and it was probably mainly due to this cause that Halm's observations showed

* Numbers in parenthesis indicate references to literature on p. 132.

such a high degree of internal agreement, the probable errors being only about one-half of those of Dunér. It was as a result of these observations that Halm concluded a variable period of rotation for the sun, his determinations for separate years showing large systematic deviations from each other. In a final paper on the subject (9) he also discussed the later observations of Dunér and arrived at the conclusion that these, like his own, gave evidence of a periodic variation in the sun's rate of rotation. The importance of the question thus raised can hardly be overestimated, and it will perhaps be the main consideration in future investigations of this problem.

All of the preceding determinations of the rotation period of the sun, with the exception of that of Jewell, have been based on visual observations. While it is probable that the photographic method does not possess for such an investigation the overwhelming advantages which it has in the case of faint and difficult spectra, it has certain points of superiority which render an independent determination by its aid of the greatest value. Two of these are especially important. The visual determinations have been based upon a very limited number of lines in the less refrangible part of the spectrum. With the photographic method it is possible to employ a much larger number of lines and to utilize the more refrangible part of the spectrum where the lines are more numerous and the variety of elements which can be employed correspondingly greater. These facts were fully realized at the time of the establishment of the Mount Wilson Solar Observatory, and plans were made for taking up a photographic investigation of the rotation period of the sun as soon as suitable instrumental equipment was ready. With the completion of the Snow telescope, and the powerful 18-foot spectrograph used in conjunction with it, a combination of apparatus admirably adapted for the work was available, and accordingly in the spring of 1906 the first observations were begun. These were continued until June, 1907, after which all observational work on the rotation of the sun was transferred to the tower telescope.

Since the investigation was commenced five series of observations have been made and are discussed in the pages which follow. Two of these deal with lines selected from the spectrum of the general reversing layer, two with the *a* line of hydrogen, and the fifth with λ 4227 of calcium. The lines of hydrogen and calcium give results differing widely from those obtained for the reversing layer, and so, of course, should be treated individually. Moreover, since the two series of determinations for the reversing layer are separated by a considerable interval of time, and the apparatus employed in the second series was entirely different from that in the first, it seems desirable to treat them separately in the present discussion. Brief accounts of the main results of these two series of observations have already been published, the first in 1907 (10) and the second in 1909 (11). A detailed account of the observations and reductions follows in Sections 1–10. The discussion and comparison of the results will be considered in Sections 11–20.

OBSERVATIONS AND METHODS OF REDUCTION.

1. Observations of 1906–1907.

The Snow telescope consists of a cœlostat mirror of 30 inches (76.2 cm) diameter mounted equatorially, which throws a beam of light upon a second plane mirror 24 inches (61.0 cm) in diameter mounted south of it. From this in turn the light passes to a concave mirror of 24 inches aperture and 60 feet (18.3 m) focal length placed at the north end of the telescope house. All of the mirrors are mounted upon masonry piers and are supplied with slow motions, so that the illumination of the concave mirror may be controlled from the cœlostat and the position of the image varied according to the instrument with which it is to be used. The direction of the beam from the second plane mirror to the concave mirror is not horizontal but is inclined at an angle of 5°, owing to the nature of the ground on which the building is placed. For a similar reason the track upon which the second mirror mounting moves does not point north and south but at an angle of 15° to this direction. The cœlostat mirror may be moved east and west upon a track and the second plane mirror north and south (more accurately northeast and southwest) in order to provide for the variation in the sun's declination. The concave mirror can be moved along the direction of the optical axis to allow for focusing of the solar image, and by simple rotation of the mirror the image may be thrown upon any instrument desired. The image formed by the concave mirror has a mean diameter of 6.7 inches (17.0 cm).

The 18-foot (5.5 m) spectrograph used in this investigation and for many other spectrum studies as well, in particular that of the spectra of sun-spots, is placed about 18 inches (45.7 cm) to one side of the optical axis and about 12 inches (30.5 cm) above it, its tube lying directly above the 5-foot spectroheliograph. It is of the Littrow, or auto-collimating, type, with a lens 4 inches (10.2 cm) in diameter used with a plane grating of the same aperture. Both lens and grating are supported on a cast-iron base. The lens is focused by a screw and moves in ways parallel to the optical axis, and may be clamped in any desired position. The grating is mounted in the face of a metal box which rests upon a rotating table, its position being defined by four screws which touch its surface lightly. The original purpose of the metal box was to provide for temperature control, if needed, but in the present investigation the exposures have been so short as to render this unnecessary. Reflections from the surface of the lens are prevented from reaching the plate by a narrow bar placed across the lens, and in addition a system of diaphragms is provided along the tube of the spectrograph. This tube is of wood covered with sheet iron and its central section immediately over the spectroheliograph can be rotated out of place in order to give free access to the prism box of the latter instrument.

The slit and plate-holder are carried by a single large casting, the base of which rests on a masonry pier. The distance between the center of the slit and the center of the plate-holder opening is about 3 inches (7.6 cm), an amount too small to introduce any appreciable astigmatism into the spectrum lines. The plate-holder may be moved up and down by a rack-and-pinion in order to provide for taking several exposures on the same plate. In front of the spectrograph and about 6 inches (15.2 cm) below the slit is a large cast-iron bracket which serves to support the various auxiliary attachments used in conjunction with the spectrograph.

The marked advantages to be derived from photographing the opposite edges of the sun simultaneously, and so doubling the displacements to be observed, led to the employment of a modified form of the device first suggested by Langley. A brass casting with a circular opening about 7 inches (17.8 cm) in diameter carries two brass arms, each of which forms a radius of this opening and rotates about its center. On the outer end of each arm is mounted a small diagonal prism, its mean distance from the center of rotation

corresponding to the mean radius of the sun's image. These prisms are capable of adjustment toward and away from the center in order to allow for variations in the diameter of the sun. At the inner ends of the brass arms and immediately in front of the slit are two other diagonal prisms which receive the beams of light from the first pair. These prisms taper at the end to a width of 0.5 mm, and are mounted with their edges about 0.25 mm apart. The latter distance, accordingly, represents the separation on the photographs of the spectra of the two opposite edges of the sun. At the outer ends of the arms are pointers by means of which readings are made upon a silvered circle concentric with the opening in the brass casting and graduated to half degrees. The whole apparatus is mounted upon the cast-iron bracket already referred to, and its position with reference to the slit is accurately defined by two taper pins which enter the bracket.

The grating which has been used throughout this investigation is one of the earlier Rowland gratings, with ruled surface 3.25 by 1.75 inches (8.3×4.4 cm), and has 14,438 lines to the inch (570 lines to the millimeter). The spectra in the second, third, and fourth orders on one side of the normal are exceptionally bright and the definition is excellent, in spite of the great focal length of the spectrograph. For all of the work on the rotation of the sun with this spectrograph the fourth order has been used, the great linear scale thus obtained being of the utmost value. In this order, at λ 4200, 1 mm = 0.71 Ångström.

The importance of accurate adjustment of the spectrograph in a study of small displacements can not be too highly emphasized. In the present investigation the greatest care has had to be taken to guard against unequal illumination of the collimating lens and grating surface by the light from the opposite edges of the sun. It is evident that a small change in the position of the diagonal prisms near the slit would affect this illumination most seriously. Accordingly, before each exposure it has been my practice to occult the images of the two edges in succession and to examine the character of the illumination from each edge. The accuracy of this test has been examined photographically and it has been found to be capable of giving good results when the slit is narrow and the illumination is fairly weak. In addition to this a valuable check upon the accuracy of the adjustment is furnished by the relative density of the pair of spectra on the photographic plates, and no plates have been included in the series used for measurement in which there is any marked difference in the intensity of the spectra of the two edges of the sun. A comparison of the ratio of aperture to focal length in the case of telescope and spectrograph shows that provided the adjustment is reasonably accurate the margin of safety for full illumination of the grating is considerable. In the case of the telescope the ratio is 1 : 30, while in that of the spectrograph for the full aperture of the collimating lens it is 1 : 54, or, for the surface of the grating actually employed, about 1 : 72.

A brief description of the actual procedure followed in taking the plates may be of value. The auxiliary diagonal prism apparatus is placed in position in front of the spectrograph and the image of the sun centered upon it and focused on the slit. The image is then slightly displaced by rotation of the cœlostat mirror, the clock stopped, and the points of transit observed of a spot or other well-defined object on the solar disk across the position circle. Usually several sets of readings have been made and a mean taken. Since the orientation of the image with this form of cœlostat mounting depends upon the position of the second plane mirror on its track as well as upon that of the cœlostat carriage, these observations for a line of reference have been made before each series of plates, and in most cases repeated after the series, especially if the interval covered is at all long. Occasionally the transits have been obtained by rotation of the cœlostat mirror by means of its slow motion, and comparison with the values secured when the image is allowed to drift shows that there is little choice between the two methods. The range of several such determinations usually amounts to about $0^{\circ}.2$ or $0^{\circ}.3$. With the aid of these observations the east-and-west reference line is found and the position of the sun's pole and equator is then readily computed from an auxiliary table, such, for example, as is given in the *Companion to the Observatory*. As soon as the position of the sun's equator is known, the diagonal prisms are set for the latitude desired, the illumination of the grating is examined, and the exposure taken. The second setting upon the position circle is then made and the process repeated. Usually six exposures have been taken upon each plate, although the number

varies according to the latitudes employed. In general, I have used the same plan as that adopted by Dunér of taking points 15° apart between 0° and 75° of latitude, but some intermediate points have also been added, particularly in the higher latitudes when the orientation of the image was especially favorable.

In selecting the region of the spectrum to be employed several considerations have been borne in mind. The use of photographic plates and the desirability of keeping the exposure times as short as possible in order to avoid heating of the slit jaws, as well as changes of focus and astigmatism of the solar image due to changes in the figure of the mirrors arising from prolonged exposure to the sun's heat, naturally led to the employment of the more refrangible part of the spectrum. The fact that the observations of Dunér and Halm were obtained in the less refrangible part also made the use of an independent region most desirable. Although the displacement of the spectrum lines for a given radial velocity is proportional to wave-length and consequently smaller in the violet part of the spectrum than in the red, this disadvantage is fully counteracted by the possibility of employing higher dispersion and fine-grained photographic plates to procure greater linear scale and higher resolution. The plates finally used were Seed's "Process" plates, which give excellent contrast and are appreciably more rapid than lantern-slide plates in the violet part of the spectrum. A second consideration which led to the selection of a region in the violet was the necessity of obtaining the lines of a sufficient variety of elements within the range of wave-length such as could be secured on a single plate. After considerable examination the part of the spectrum between λ 4200 and λ 4300 was selected. The plates employed are very sensitive to this region, and within its limits are found an immense number of lines including a part of the G group, as well as the head of the first violet cyanogen fluting. The presence of the so-called "blue line" of calcium at λ 4227 has also proved of great value in the later observations. The list of lines finally adopted is given in Table 1. The wave-lengths, intensities, and identifications are from Rowland's table.

TABLE 1.—LINES OBSERVED IN 1906–1907.

λ	ELEMENT.	INTENSITY.	BEHAVIOR AT LIMB.
4196.699	*La*	2	Much weakened.
4197.257	*CN*	2	Slightly weakened.
4203.730	*Cr*	2	Strengthened and widened.
4209.144	*Zr*	1	Weakened.
4216.136	*CN*	1	Weakened.
4220.509	*Fe*	3	Slightly strengthened and widened.
4232.887	*Fe*	2	Much strengthened and widened.
4257.815	*Mn*	2	Slightly strengthened and widened.
4258.477	*Fe*	2	Much strengthened and widened.
4265.418	*Fe*	2	Slightly weakened.
4266.081	*Mn*	2	Slightly weakened.
4268.915	*Fe*	2	Slightly weakened.
4276.836	– *Zr*	2	Weakened.
4284.838	*Ni*	1	Slightly weakened.
4287.566	*Ti*	1	Slightly strengthened and widened.
4288.310	*Ti, Fe*	1	Widened.
4290.377	*Ti*	2	Slightly weakened. Enhanced line of *Ti*.
4290.542	*Fe*	1	Slightly weakened.
4291.630	*Fe*	2	Much strengthened.
4294.936	*Zr*	2	Probably weakened.

The reasons for the selection of the lines in the above list are for the most part self-evident. The lines of cyanogen are included because of the low level at which carbon, and presumably its compounds, lie in the sun's atmosphere, if we may judge from chromospheric observations. The line of lanthanum was selected because of the high atomic weight of this element, and the consequent presumption for a relatively low level,

and the same reason holds in lesser degree for zirconium. Iron is represented by seven lines in the list, a number sufficient to eliminate to a great extent possible peculiarities among individual lines when a mean value is taken. Titanium is of great interest because of its relatively high level in the chromospheric spectrum, and a larger number of lines would have been desirable in its case. The necessity, however, for selecting the lines best suited for measurement, and free from close neighboring lines, has limited the number to three. Of these λ 4290.377 is an enhanced line, that is, relatively stronger in the spark spectrum than in that of the arc. The other lines belong to elements having an atomic weight close to that of iron.

The last column in Table 1 gives the behavior of the lines at the limb of the sun as compared with the center. At the time at which the list was selected these remarkable differences in intensity and appearance were not known (12). It was noted on the earliest plates, however, that the lines at the limb as a rule were decidedly broader and more diffuse, as well as in most cases somewhat weaker, than the lines of the ordinary solar spectrum in this region. At first this was thought to be due to some instrumental cause, possibly the long path traversed by the light through the glass of the diagonal prisms, but the discovery soon afterward, by Mr. Hale and myself, of the essential differences in character of the spectrum of the sun's limb fully explained the difficulty. In view of this relative diffuseness of the lines in the immediate neighborhood of the edge of the sun, it seems to me probable that a slightly higher degree of accuracy might be attained in future observations by taking the light from a point somewhat farther within the disk than that which is usually employed, and applying the small corrections needed to reduce to the sun's edge. Observations have shown that the spectrum of the limb reverts to the normal solar spectrum very rapidly as the slit is moved away from the sun's edge, and the gain in the sharpness of the lines would probably more than compensate for the small difference in the size of the displacements measured. An accurate knowledge of the distance of the slit from the limb would, of course, be essential.

2. Record of Observations, 1906–1907.

The series of plates employed in this investigation, numbering 44, began in May, 1906, and extended to June, 1907. Between July and October, 1906, no plates were taken, but with the exception of this interval the period is fairly well covered. The plates used do not include all which were taken, but careful selection was made with special regard to quality and the conditions under which they were obtained. Halm has called attention to the importance of the transparency of the sky in such observations, the effect of a hazy sky, or light cloudiness, being to superpose the spectrum of skylight upon the spectrum from the edge of the sun, and consequently to make the displacements measured systematically too small. This point was usually tested visually in the same way as was done by Halm, and a few quantitative determinations of the effect were also made from photographs obtained at a time when the sky was particularly hazy.

The record of the observations contained in Table 2 gives the data for the individual plates. The estimates of the definition in the fourth column are on a scale of 10. The column headed "Scale concave mirror" refers to the setting of the concave mirror mounting upon its track and is read upon an arbitrary scale. Positive readings indicate a direction north from zero, or a greater distance between mirror and slit. The considerable variations in these readings are due to the change of figure of the system of mirrors, particularly of the cœlostat mirror, when exposed to the sun's heat. This change is dependent upon a variety of conditions, especially the state of the silver surfaces of the mirrors and the temperature of the air surrounding them. The column headed "Observations for zero" gives the readings of the points of transit across the position circle of definite points on the sun's disk. The method of observing these has been explained previously. The readings of the position circle refer to the settings of the pair of diagonal prisms, and it is from these settings that the latitudes of the observed points on the sun's edge are calculated. The numbers following the words "cœlostat" and "second flat" in the column of remarks indicate the positions of these mirrors on their respective tracks. The orientation of the sun's image of course is dependent upon these quantities.

TABLE 2.—RECORD OF OBSERVATIONS, 1906–1907.

DATE.	HOUR G. M. T.	PLATE No.	DEFINITION.	EX-POSURE TIME.	SLIT WIDTH.	SCALE CONCAVE MIRROR.	OBSERVATIONS FOR ZERO.	EXPOSURE.	READINGS POSITION CIRCLE.	REMARKS.
1906	h m			sec	mm		° °		°	
May 3	7 30	ω 3	2	240	0.025	+10	80.2–299.3	1	219.2	Zero very difficult on account of definition.
							80.3–300.0	2	234.2	
							94.7–286.0	3	249.2	
							95.1–285.0	4	264.2	
							96.1–284.7	5	279.2	
								6	294.2	
May 8	6 0	ω 6	4	250	0.025	−18	114.5–267.5	1	293.2	
							96.1–286.5	2	278.2	
							114.5–266.8	3	263.2	
							95.6–286.5	4	248.2	
								5	233.2	
								6	218.2	
May 19	10 30	ω 8	5	125	0.025	+252	101.5–281.0	1	302.0	Cœlostat 200.
							101.7–280.5	2	297.0	Second Flat 600.
								3	285.7	Mirrors resilvered.
								4	270.7	Prisms cleaned.
								5	255.7	Bars interfere with windows at
								6	242.0	300° and at 240°.
								7	225.7	
June 12	6 45	ω 19	5	45	0.030	+200	100.6–286.0	1	219.3	
							100.3–286.0	2	234.3	
							102.2–284.2	3	249.3	
							104.0–282.5	4	264.3	
							103.6–282.7	5	279.3	
								6	294.3	
June 12	7 15	ω 20	5	60	0.030	+200	......	1	219.3	
								2	234.3	
								3	249.3	
								4	264.3	
								5	279.3	
								6	294.3	
June 12	7 45	ω 21	5	60	0.030	+300	......	1	294.3	
								2	278.3	
								3	279.3	
								4	264.3	
								5	249.3	
								6	234.3	
								7	219.3	
June 15	6 0	ω 23	4	65	0.030	+170	102.3–283.8	1	293.0	Cœlostat 300.
							103.0–283.2	2	278.0	Second Flat 800.
							88.5–298.0	3	263.0	
								4	248.0	
								5	233.0	
								6	218.0	
June 15	6 15	ω 24	3	65	0.030	+150	......	1	218.0	
								2	233.0	
								3	248.0	
								4	263.0	
								5	278.0	
								6	293.0	
June 15	6 35	ω 25	3	65	0.030	+150	......	1	293.0	
								2	278.0	
								3	263.0	
								4	248.0	
								5	233.0	
								6	218.0	
June 16	6 20	ω 26	4	65	0.030	+90	102.3–285.3	1	294.7	Cœlostat 400.
							105.7–284.5	2	279.7	Second Flat 870.
							105.7–284.7	3	264.7	
								4	249.7	
								5	234.7	
								6	219.7	

Table 2.—Record of Observations, 1906–1907—Continued.

Date.	Hour G. M. T.	Plate No.	Definition.	Exposure time.	Slit width.	Scale concave mirror.	Observations for zero.	Exposure.	Readings position circle.	Remarks.
1906	h m			sec	mm		° °		°	
June 16	7 5	ω 27	3	65	0.030	+90	......	1	294.7	
								2	279.7	
								3	264.7	
								4	249.7	
								5	234.7	
								6	219.7	
Oct. 19	11 10	ω 30	2–3	75	0.030	+260	83.0–293.0	1	72.0	Angles reckoned from B readings on west side position circle.
							82.8–293.3	2	87.0	
							82.5–294.0	3	102.0	Cœlostat 112.
								4	117.0	Second Flat 300.
								5	132.0	
								6	147.0	
Oct. 19	12 10	ω 31	2–3	90	0.032	+266	......	1	147.0	
								2	132.0	
								3	117.0	
								4	102.0	
								5	87.0	
								6	72.0	
Nov. 11	10 0	ω 35	4	45	0.032	+400	83.5–275.0	1	141.7	
							83.3–275.3	2	66.7	Zero observations at $6^h\ 0^m$.
Nov. 11	10 15	ω 36	4	50	0.030	+400	......	1	66.7	Distance between windows changed to 165.1 mm; between inside edges 83.55 mm.
								2	81.7	
								3	96.7	
								4	111.7	
								5	126.7	
								6	141.7	
Nov. 11	10 40	ω 37	4	50	0.032	+400	......	1	141.7	
								2	126.7	
								3	111.7	
								4	96.7	
								5	81.7	
								6	66.7	
Nov. 11	11 0	ω 38	4	55	0.032	+400	......	1	66.7	
								2	81.7	
								3	96.7	
								4	111.7	
								5	126.7	
								6	141.7	
Nov. 11	11 15	ω 39	4	60	0.032	+400	80.2–280.0	1	141.7	Zero observations at $11^h\ 30^m$.
							79.8–280.3	2	126.7	
							79.5–280.3	3	111.7	
							79.3–280.6	4	96.7	
								5	81.7	
								6	66.7	
Dec. 18	5 50	ω 39½	5	60	0.032	+120	......	1	124.5	
								2	109.5	
								3	94.5	
Dec. 18	6 40	ω 40	4–5	70	0.028	+175	90.2–296.5	1	94.5	Cœlostat 858.
							90.3–296.0	2	109.5	Second Flat 0.
							90.5–296.0	3	124.5	Zero observations at $5^h\ 0^m$ and at $11^h\ 5^m$.
							90.6–295.2	4	124.5	
								5	109.5	
								6	94.5	
Dec. 18	6 50	ω 41	5	70	0.025	+140	......	1	124.5	
								2	109.5	
								3	94.5	
								4	94.5	
								5	109.5	
								6	124.5	

Table 2. — Record of Observations, 1906–1907 — Continued.

Date.	Hour G. M. T.	Plate No.	Definition.	Exposure time.	Slit width.	Scale concave mirror.	Observations for zero.	Exposure.	Readings position circle.	Remarks.
1906	h m			sec	mm		° °		°	
Dec. 18	10 30	ω 46	4	65	0.030	+150	......	1	141.0	
								2	126.0	
								3	126.0	
								4	141.0	
								5	141.0	
								6	126.0	
Dec. 18	10 50	ω 47	4	70	0.030	+150	78.0–282.5	1	126.0	
							78.3–282.7	2	141.0	
							102.5–258.5	3	133.5	
							102.0–258.5	4	117.0	
								5	117.0	
								6	133.5	
1907 Feb. 3	5 40	ω 50	3–4	70	0.030	+220	105.6–289.5	1	221.0	Zero observations at 4^h 40^m.
							98.6–296.5	2	230.0	
							101.7–293.5	3	246.0	
							102.8–292.3	4	262.0	
								5	277.0	
								6	293.0	
Feb. 15	5 40	ω 55	4	60	0.030	+160	101.0–293.3	4	266.0	Zero observations at 5^h 0^m.
							95.5–298.5	5	282.0	
							93.3–300.5	6	297.0	
							94.0–300.3			
							96.5–298.0			
							101.5–292.3			
Feb. 15	6 5	ω 56	4	55	0.030	+180	94.3– 99.5	1	218.0	
							95.0– 99.2	2	234.0	
								3	250.0	
								4	266.0	
								5	282.0	
								6	297.0	
Feb. 28	7 15	ω 60	3–4	60	0.030	+250	......	1	302.0	
								2	302.0	
								3	288.0	
								4	280.3	
								5	273.3	
								6	264.5	
								7	257.5	
Feb. 28	7 40	ω 61	3–4	60	0.030	+250	97.0–297.3	1	248.3	Zero observations at 7^h 55^m.
							82.0–312.3	2	242.3	
							102.3–291.6	3	242.3	
							135.7–259.3	4	248.3	
								5	257.5	
								6	264.5	
Feb. 28	9 15	ω 62	3	65	0.030	+250	70.5–298.5	1	302.0	Zero observations at 9^h 30^m.
							70.7–298.3	2	288.0	
							91.0–278.5	3	280.3	
							123.5–246.0	4	273.3	
								5	265.5	
								6	257.5	
Feb. 28	9 45	ω 63	3	65	0.030	+250	......	1	251.8	
								2	244.8	
								3	260.6	
								4	267.6	
								5	275.2	
								6	288.8	
April 7	3 20	ω 64	5	90	0.030	+180	96.3–299.0	3	235.0	Zero observations at 0^h 10^m. Mirrors badly tarnished.
							99.5–295.7			
							105.3–289.7			
							93.0–302.2			
							105.7–289.5			

TABLE 2.—RECORD OF OBSERVATIONS, 1906–1907—Continued.

DATE.	HOUR G. M. T.	PLATE No.	DEFINITION.	EX-POSURE TIME.	SLIT WIDTH.	SCALE CONCAVE MIRROR.	OBSERVATIONS FOR ZERO.	EXPOSURE.	READ-INGS POSITION CIRCLE.	REMARKS.
1907	h m			sec	mm		° °		°	
April 7	5 45	ω 67	3	100	0.030	+150	......	3	235.5	
April 7	6 45	ω 68	3	100	0.030	+150	......	6	235.5	
April 7	7 10	ω 69	3	100	0.030	+150	......	1	235.5	
April 22	8 20	ω 81	3	80	0.028	+360	91.5–308.7	1	248.0	Zero observations at $7^h\ 30^m$.
							93.5–306.5	2	248.0	
							96.0–304.0	3	242.5	
								4	242.5	
								5	235.0	
								6	235.0	
May 10	10 15	ω 83	3–4	80	0.025	+355	105.0–283.5	1	227.0	Zero observations at $9^h\ 20^m$.
							93.3–295.5	2	232.0	
								3	243.0	Distance between inside edges of windows changed to 163.8 mm.
								4	243.0	
								5	232.0	
								6	227.0	
May 30	12 5	ω 85	3–4	100	0.022	+356	103.0–285.2	1	220.7	Zero observations at $11^h\ 40^m$.
							103.2–285.3	2	225.7	
								3	236.7	
								4	236.7	
								5	225.7	
								6	220.7	
May 31	4 55	ω 86	4	100	0.020	+280	99.3–290.8	1	220.0	Zero observations at $4^h\ 20^m$.
							99.7–290.5	2	225.0	
								3	237.0	
								4	256.3	
								5	271.3	
								6	286.3	
June 22	3 10	ω 87	3–4	90	0.030	+400	91.7–279.0	1	223.5	Zero observations at $9^h\ 55^m$.
								2	230.5	
								3	230.5	
								4	244.0	
								5	259.5	
								6	274.5	
June 22	11 10	ω 88	3–4	120	0.030	+400	......	1	274.5	
								2	259.5	
								3	244.0	
								4	230.5	
								5	230.5	
								6	223.5	
June 22	11 40	ω 89	3–4	120	0.030	+400	78.0–294.5	1	223.5	Zero observations at $12^h\ 30^m$.
							78.0–294.5	2	230.5	
								3	230.5	
								4	244.0	
								5	259.5	
								6	274.5	
June 23	5 20	ω 90	3	120	0.032	+280	102.7–283.3	1	225.0	Zero observations at $4^h\ 45^m$.
							103.0–283.3	2	236.5	
								3	234.0	
								4	252.2	
								5	267.7	
								6	282.7	
June 23	5 20	ω 91	3	120	0.032	+280	......	1	282.7	
								2	267.7	
								3	252.2	
								4	236.5	

3. Methods of Measurement and Reduction.

The series of photographs used in this investigation have been measured upon two comparators, one by Toepfer of Potsdam, with a 150 mm screw, and the other by Gaertner of Chicago, with an 80 mm screw. The Toepfer instrument has been used by Miss Lasby of the Computing Division, and the Gaertner machine by myself. The screws of both comparators have a pitch of 0.5 mm and have been investigated for periodic errors as well as for errors of run, with results which have proved most satisfactory. In the case of the Toepfer instrument, upon which a majority of the plates have been measured, the series of determinations of a fixed distance ruled on a glass plate for every alternate 10 revolutions of the screw between 10 and 280 indicates remarkably small periodic errors. At a maximum these amount to 0.3 μ (0.0003 mm), which is considerably below the limit of accuracy of measurement for spectrum plates. The reading head of the Toepfer comparator is divided into 100 parts, and so can be read directly to 5 μ, and by estimation to 0.5 μ. The errors of run are also small, but of course do not need to be considered in small differential measures of this sort.

An examination of the screw of the Gaertner comparator indicates periodic errors amounting at a maximum to 2 μ. If this amount entered fully into the value of the displacements it would of course be necessary to apply corrections for it. Since the maximum error, however, applies only to a half-revolution of the screw, that is, 250 μ, while the largest displacements measured (at the sun's equator) are 90 μ, it is evident that only about one-third of the total value can affect the measures. Moreover, in reversing the plate for the second series of measures, care has been taken to set the plate in such a way that the opposite part of the revolution of the screw is employed to that used in the first series. The effect, accordingly, is to balance the errors in the two cases, and it seems altogether probable that the errors due to the irregularities of the screw with this comparator, as in the case of the larger instrument, fall well below the errors of measurement. The reading head of the Gaertner comparator is divided into 500 parts, so that settings can be made directly to 1 μ, and estimations to 0.1 μ, if desired.

The procedure followed in measuring the plates is as follows. After the plate has been adjusted on the comparator so that the small interval separating the two spectra of the opposite limbs falls at the center of the field of view, and the plate has been carefully lined up for parallelism to the direction of motion of the screw, four settings are made on each line in the two spectra. The difference between the means of these settings gives the relative displacements of the lines between the two limbs, or double the displacement due to the rotation of the sun. After the whole plate has been measured throughout in this way it is reversed and a similar series of settings made in the second position. Since only dark lines are involved, no such systematic differences between the results in the two directions due to physiological causes are found as in the case of spectra in which a comparison spectrum with bright lines is used, but the additional set of measures has proved most useful in correcting peculiarities in the appearance of individual lines, and a higher degree of accuracy, of course, is obtained from this doubling of the number of settings. The means of the displacements obtained from the two series of measures are then combined to give the final values. The complete measurement in both directions of a plate containing 6 latitudes involves a total of 1920 settings.

A most important consideration in the measurement of the plates is the question of the inclination of the micrometer wire in the eye-piece of the measuring instrument. Unless this is accurately parallel to the true direction of the spectrum lines, a considerable error may be introduced into the displacements, since reversal of the plate does not affect the position of the wire in this regard. It is evident that the correction could be obtained by making the second measurement through the glass, but the practical objections to this procedure are obvious, and it is probable that small errors might be introduced by refraction in the glass plate. Accordingly, the following method was finally adopted. A solar spectrum taken with a long slit was obtained at the center of the sun with the direction of the slit parallel to the sun's axis, a position

in which the inclination of the lines evidently would not be affected by the sun's rotation. With this plate as a standard the vertical micrometer wire was carefully adjusted until it coincided with the lines of the spectrum throughout their entire length and then clamped in position. Since the lines of the rotation spectra are very short (about 1.5 mm for each pair of spectra), it is evident that the accuracy of adjustment for these spectra must be all that can be desired. When any change in the inclination of the slit has been made, or the grating rotated about a vertical axis, a new standard plate has been taken and the micrometer wire readjusted. This has been done on but one occasion in the present series of observations.

After the linear displacements have been obtained in this way the conversion into velocity is effected by the aid of Table 3. The second column gives the factor for conversion of the displacements into Ångström units, and the third the value of a displacement of one Ångström unit in kilometers for each of the lines measured. The last column is the product of the two by the factor one-half, since double the rotational velocity is actually measured. It is this column which is used in practice. The table is for the Toepfer comparator; for the Gaertner instrument the quantities in the second and fourth columns are twice as large, since the unit of measurement is the millimeter instead of the half-millimeter as in the case of the Toepfer comparator.

TABLE 3.—CONVERSION OF DISPLACEMENTS INTO VELOCITIES. OBSERVATIONS OF 1906–1907.

λ	One revolution in Ångströms.	One Ångström in km.	One-half revolution in km.	λ	One revolution in Ångströms.	One Ångström in km.	One-half revolution in km.
4196.699	0.3546	71.45	12.67	4266.081	0.3508	70.29	12.33
4197.257	0.3546	71.44	12.66	4268.915	0.3506	70.24	12.32
4203.730	0.3543	71.33	12.64	4276.836	0.3502	70.11	12.28
4209.144	0.3540	71.24	12.61	4284.836	0.3497	69.98	12.24
4216.136	0.3536	71.12	12.58	4287.566	0.3496	69.94	12.22
4220.509	0.3534	71.05	12.56	4288.310	0.3495	69.92	12.22
4232.887	0.3527	70.84	12.50	4290.377	0.3494	69.89	12.21
4257.815	0.3512	70.43	12.36	4290.540	0.3494	69.89	12.21
4258.477	0.3512	70.42	12.36	4291.630	0.3494	69.87	12.20
4265.418	0.3508	70.30	12.33	4294.936	0.3491	69.82	12.18

The velocities obtained in this manner are those observed directly, and in order to convert them into the velocities corresponding to the sidereal rotation period of the sun it is necessary to apply three corrections. The first of these is the small correction for reduction to the edge of the sun, since the slit is always set a small distance inside the limb. This is readily found by computation, since the distance of the diagonal prisms which admit the light is accurately known with reference to the center of the sun, and the diameter of the image for any date can be found by the aid of an almanac when the setting of the concave image-forming mirror is known. The correction accordingly will always take the form of multiplication by a factor slightly greater than unity. A slight allowance has been made for the difference in the size of the solar image at the focus and at the point where the light falls upon the diagonal prisms.

The second correction is that for the departure of the sun's pole from its visible edge. In this case the correction consists of multiplication by the secant of an auxiliary angle which is designated by η in Dunér's memoir (5a), and for the derivation of which the necessary formulæ have been given by him in full. If we put

i = inclination of the sun's equator
$\odot$ = longitude of the sun
Ω = longitude of the ascending node of the sun's equator
π = polar distance of the point observed

the formula reads

$$\sin \eta = -\frac{\sin i \sin (\odot - \Omega)}{\sin \pi}$$

In all cases in which the value of η is large the values have been worked out rigorously. In the lower latitudes, where the values of η are comparatively small and vary but slightly, use has been made of the convenient table given by Dunér.

A third correction is required to allow for the earth's motion in its orbit, or, in other words, to reduce the observed values of the rotation period of the sun to the sidereal rotation period. The formulæ necessary for the derivation of this correction have also been worked out completely by Dunér and are given by him in his memoir, together with excellent tables of reference. Frequent use has been made of these in reducing the results given here. It would of course give the same final values to convert the observed linear velocities into angular velocities and then apply the corrections necessary to allow for the earth's motion directly from the almanac values, and in some ways this procedure would be preferable. To facilitate comparisons with other results it has seemed desirable to add the corrections directly to the linear velocities. The total value of this correction varies from 0 at the pole to about 0.14 km at the equator.

The computation of the heliographic latitudes of the points under observation is made in the following way with the aid of De La Rue's *Tables for Determining the Angle of Position of the Sun's Axis :* The position angle of the sun's axis in reference to the north point, as well as the heliographic latitude of the earth, is found for the date of observation, the tables being constructed with the sun's longitude as an argument. The position of the north point is found in the way already explained by transits of the sun's disk across the position circle of the instrument. Accordingly, if

p = position angle of point from sun's north point
P = angle of sun's pole from north point
D = earth's heliographic latitude

the heliographic latitude ϕ of the point desired is found by the formula

$$\sin \phi = \cos (p - P) \cos D$$

The polar distance π is, of course, the complement of the angle ϕ.

4. Sources of Error.

As in all quantitative investigations of the displacements of spectrum lines, the errors in the results obtained in the present study naturally fall under two heads. Under the first are those due to instrumental causes, leading to errors in the values of the displacements on the plates. Under the second fall errors arising from the measurement of the plates and the reduction of the results obtained. There can be little doubt that of these two the first is by far the more serious, since errors of this sort are much more liable to be of a systematic character than those arising from either measurement or reduction.

The principal sources of error to be considered under the first head are as follows :

(1) Astigmatism, changes of focus, and lack of definition of the solar image.

(2) Heating of the slit jaws during exposures.

(3) Unequal illumination of the grating from the opposite edges of the sun.

(4) The presence of the spectrum of skylight, which tends to reduce the values of the displacements observed.

I have already discussed (3) and (4) in a preceding paragraph and described the precautions taken to avoid the introduction of error from them. It seems probable that any difficulty due to the presence of the skylight spectrum can hardly be appreciable when the plates used for measurement have been selected

from those taken on especially transparent days. Experiments made by Mr. Hale and myself (13) have indicated that on a day of average transparency on Mount Wilson the brightness of the sky spectrum close to the edge of the sun is about one-fortieth that of the spectrum inside the limb. Accordingly, this would represent about the maximum effect in the case of the plates under consideration, and a contribution of one-fortieth to the intensity of the spectrum lines would probably be entirely inappreciable both in the appearance of the plates and in the measurement. The influence of inequalities in the illumination of the grating can probably never be absolutely eliminated, but with the aid of the precautions taken in securing the exposures I feel confident that the effect has been reduced to a minimum, and that in an extended series of observations the residual effect can be regarded mainly as an accidental error which will tend to eliminate itself with a sufficient number of plates.

The question of the heating of the slit jaws during the exposures has been treated with especial care, since errors arising from this source have been encountered by other observers. On account of the comparatively small ratio of 1 : 30 between aperture and focal length in the Snow telescope, and the relatively large image employed, the amount of heat which falls upon the slit is of course much less than in the case of relatively short focus telescopes. Additional advantages are the silvering of the slit jaws, which helps to reflect the heat that falls upon them, and the fact that a length of only about 3 mm of the slit is exposed to the sun when the plate is taken. In order to obtain a definite test, however, I have tried several exposures upon the same part of the sun, using a comparison spectrum obtained with and without the interposition of a glass cell containing a thickness of 20 mm of water. Such a screen could hardly fail practically to eliminate heat effects on the slit. The measurement of these plates has indicated no difference whatsoever between the results obtained with and without the screen, and the conclusion seems to be warranted that any effect upon the rotation values due to heating of the slit jaws during the exposures must be very small.

The first source of error referred to in the list, which has to do with the astigmatism and lack of definition of the sun's image upon the slit of the spectrograph, is perhaps the most serious of any encountered in the investigation. In working with the Snow telescope we have found that the definition of the solar image toward the middle of the day is much inferior to what it is in the early morning and late afternoon, and that the effect of prolonged exposure of the mirrors to sunlight at this time of day is to introduce a considerable amount of astigmatism due to changes of figure of the plane mirrors. This shows itself in a distortion of the image and a difference of focus between the vertical and horizontal diameters. The effect of this upon determinations of rotation is to introduce into the slit additional light from points differing slightly in latitude from those upon which the diagonal prisms are set, and also to cause a slight difference for different latitudes in the distance from the sun's edge at which the light is taken. The first is probably much the more serious. The effect of changes of focus during the exposures is also in the direction of bringing into the slit scattered light from other latitudes than those upon which the instrument is set, and the same holds true of most defects in the character of the sun's image.

Since the plates for the determination of the rotation of the sun have been taken for the most part toward the middle of the day, the early morning hours and the late afternoon being utilized for the spectroheliograph, the effects discussed here must have influenced the results obtained to a certain extent. The selection of the plates to be used for measurement, however, and the rejection of those which were obtained under especially unfavorable conditions, must have rendered decidedly less the amount of the error from this source which can enter into the determinations. In taking the plates it has been found possible to reduce materially the amount of astigmatism and variation of focus by keeping the mirrors cooled by a circulation of air about them from electric fans, and by shutting off the sunlight for short intervals between the successive exposures on the plate. It is evident that even in the case of a poorly defined image the main effect of the introduction into the slit of the scattered light from points bordering on the latitudes employed will be to widen the lines without altering the displacements seriously, since in general the foreign light will come from regions distributed symmetrically about these points of latitude. In the

case, however, of a marked change in the character of the image during the exposures on the various latitudes, systematic errors might be introduced, and such effects would naturally be greater in the higher latitudes, where the change of velocity with the latitude is more rapid than it is near the equator. It is of course impossible to say to what extent these effects may have entered, and I can only emphasize the fact that all the precautions which have seemed feasible have been taken to keep the character of the image the same during the series of exposures.

A consideration of the second class of errors which may influence these results, those that arise from errors of measurement and reduction, may be passed over rapidly. The methods of measurement and the screw errors affecting the instruments employed have already been discussed in full, and it seems probable that there can be but little systematic error due to this source affecting the results. In the reductions, moreover, methods rigorous within the limits of accuracy required have been followed, and consequently there is little to be feared from this source except as regards numerical errors of computation. To avoid the latter a considerable part of the work has been done in duplicate, especially that involving the various corrections to the observed velocities and the computation of the latitudes. The conversion of the measured displacements into velocities is readily checked by comparison with a standard table.

In conclusion it should be noted that small absolute errors may be introduced into the results by uncertainty in the values of the constants of reduction employed. Throughout the observations of 1906–1907 the following values, by Carrington, of the inclination of the sun's equator i and the longitude of its ascending node Ω have been used.

$$i = 7^\circ\ 15' \qquad \Omega = 74^\circ\ 24'\ (1906)$$

In concluding this discussion of the sources of error in the observations, reference should be made to a class of phenomena present in the sun which under certain conditions may very seriously affect the results obtained for the rotation. These are the disturbances in the solar atmosphere which have been discussed recently under the term "Solar Vortices" (14), although their character is as yet by no means clear. The influence of the presence of such disturbances will be referred to more fully in connection with the consideration of the series of observations of 1908, and some numerical results will be given at that time. It is sufficient to call attention here to the fact that these solar storms sometimes affect very large regions of the sun's surface, and that throughout these regions the velocities due to the rotation of the sun may be greatly modified by the proper motions of the areas involved.

5. Results for the Individual Plates, 1906–1907.

The detailed results for the separate plates used in this investigation are given in Table 4. The main consideration borne in mind in the construction of this table has been to give all the data essential to an independent computation of the values derived from the plates. With this in view, at the beginning of the summary for each plate are given the constants used in the reduction of that plate, together with the necessary data for the computation of the latitudes and the auxiliary angles employed in correcting the observed values. Although most of the symbols have already been defined, for the sake of convenience it may be well to repeat them at this point.

$\odot$ = longitude of sun.
Ω = longitude ascending node of sun's equator = $74^\circ.4$ for 1906.
P = angle between sun's pole and north point.
D = earth's heliographic latitude.
π = heliographic polar distance of point observed = $90^\circ - \phi$.
η = angle made by the plane passing through the point observed, the sun's pole, and its center, with the plane corresponding to the sun's visible edge.

The diameter of the image is found by computation in the way already described from the almanac value of the sun's angular semi-diameter combined with the concave mirror setting of the Snow telescope. The "factor" referred to is the semi-diameter divided by one-half the distance between the diagonal prism openings which admit the light to the slit.

The results for the individual lines of each plate for the various latitudes are given immediately below the constants for the plate. The values of Δ are the mean total displacements expressed in half-millimeters. Hence the largest displacements measured are about 0.075 mm. In the case of plates measured with the Gaertner comparator the values of the displacements have been multiplied by two, in order to make all of the quantities given homogeneous. The meaning of the other symbols employed in the tables is as follows:

v = linear velocity corresponding to the sun's synodic period of rotation.
v_1 = correction for reduction to sidereal period of rotation.
ξ = daily angular velocity corresponding to the sidereal period of rotation.

It is evident from the consideration of the methods of reduction that

$$v = \Delta \times \left\{ \begin{matrix} \text{Value one-half revolution} \\ \text{of micrometer in km} \end{matrix} \right\} \times \text{Factor} \times \sec \eta$$

The values of the second quantity are obtained from the last column of Table 3. The corrections v_1 are from the tables of Dunér (5). The value of ξ is readily found from $v + v_1$ by means of the formula

$$\xi = \frac{N(v + v_1)}{2\pi R \cos \phi} 360^\circ = [0.851228] \frac{v + v_1}{\cos \phi}$$

where N is the number of seconds in a mean solar day and R is the sun's radius in kilometers.

Some of the values for the individual plates given in Table 4 differ to a certain extent from those which appeared in an earlier communication (10). This is due mainly to the inclusion of a number of measures of plates by myself which I have found an opportunity to make in the interval since the first publication. As a consequence the mean values obtained represent much more nearly the average values for the two observers, Miss Lasby and myself, than did the earlier results. The values given here should accordingly be more nearly free from systematic peculiarities of measurement. There are also a few changes due to revision of the constants applied for correction of the observed velocities, particularly of the constant of reduction to the sidereal period of rotation. The final effect of all such changes on the mean values, however, is very small, the largest difference in the mean for any normal place amounting to about 0.005 km. In the table the abbreviations L. and A. refer to Miss Lasby and myself, while the two comparators used, the Toepfer and Gaertner instruments, are designated by T. and G. respectively.

Table 4. — Results for Individual Plates. Observations of 1906–1907.

Plate ω 3. 1906, May 3, $7^h\ 30^m$ G. M. T. Measured by L. on T. Distance from Limb 2.4 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	42.4	5.2	6.4	83.6	36.9	1.250
⊙ − ☊	− 32.0	20.2	20.5	69.5	11.0	1.019
P	23.9	35.2	35.4	54.6	6.6	1.007
D	− 3.8	50.2	50.3	39.7	5.0	1.004
Diameter	172.0 mm	65.2	65.3	24.7	4.2	1.003
Factor	1.028	80.2	80.2	9.8	3.9	1.002

λ	$\phi = 9°.8$				$\phi = 24°.7$				$\phi = 39°.7$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.145	1.891	2.027	14.61	0.127	1.658	1.787	13.96	0.098	1.282	1.395	12.87
4197.257	0.145	1.891	2.027	14.61	0.128	1.670	1.799	14.06	0.100	1.305	1.418	13.08
4203.730	0.146	1.896	2.032	14.64	0.130	1.692	1.821	14.23	0.100	1.303	1.416	13.06
4209.144	0.146	1.890	2.026	14.60	0.132	1.714	1.843	14.40	0.102	1.327	1.440	13.29
4216.136	0.146	1.887	2.023	14.58	0.129	1.672	1.801	14.07	0.100	1.297	1.410	13.01
4220.509	0.145	1.875	2.011	14.49	0.131	1.694	1.824	14.35	0.102	1.315	1.428	13.18
4232.887	0.147	1.892	2.028	14.62	0.132	1.699	1.828	14.28	0.101	1.302	1.415	13.06
4257.815	0.149	1.900	2.036	14.67	0.133	1.696	1.825	14.26	0.104	1.331	1.444	13.32
4258.477	0.149	1.896	2.032	14.64	0.132	1.680	1.809	14.14	0.103	1.312	1.425	13.15
4265.418	0.147	1.865	2.001	14.42	0.132	1.674	1.803	14.09	0.104	1.321	1.434	13.23
4266.081	0.149	1.886	2.022	14.57	0.133	1.685	1.814	14.18	0.103	1.305	1.418	13.08
4268.915	0.148	1.874	2.010	14.48	0.132	1.672	1.801	14.07	0.102	1.295	1.408	12.99
4276.836	0.146	1.848	1.984	14.30	0.131	1.659	1.788	13.97	0.103	1.305	1.418	13.08
4284.838	0.147	1.855	1.991	14.35	0.132	1.670	1.799	14.06	0.102	1.293	1.406	12.97
4287.566	0.147	1.855	1.991	14.35	0.132	1.668	1.797	14.04	0.103	1.305	1.418	13.08
4288.310	0.148	1.865	2.001	14.42	0.132	1.666	1.795	14.03	0.104	1.315	1.428	13.18
4290.377	0.147	1.852	1.988	14.33	0.130	1.641	1.770	13.83	0.104	1.313	1.426	13.16
4290.542	0.148	1.863	1.999	14.41	0.134	1.686	1.815	14.18	0.102	1.288	1.401	12.93
4291.630	0.148	1.862	1.998	14.40	0.132	1.662	1.791	14.00	0.104	1.312	1.425	13.15
4294.936	0.148	1.861	1.997	14.39	0.133	1.673	1.802	14.08	0.104	1.311	1.424	13.14

λ	$\phi = 54°.6$				$\phi = 69°.5$				$\phi = 83°.6$			
4196.699	0.068	0.892	0.981	12.02	0.038	0.504	0.564	11.43	0.008	0.132	0.160	10.19
4197.257	0.069	0.904	0.993	12.17	0.037	0.493	0.553	11.21	0.009	0.146	0.174	11.08
4203.730	0.070	0.916	1.005	12.32	0.041	0.543	0.603	12.22	0.009	0.145	0.173	11.02
4209.144	0.070	0.914	1.003	12.29	0.041	0.541	0.601	12.18	0.008	0.131	0.159	10.13
4216.136	0.069	0.901	0.990	12.13	0.040	0.527	0.587	11.90	0.009	0.145	0.173	11.02
4220.509	0.070	0.909	0.998	12.23	0.041	0.542	0.602	12.20	0.010	0.161	0.189	12.04
4232.887	0.070	0.901	0.990	12.13	0.041	0.539	0.599	12.14	0.010	0.161	0.189	12.04
4257.815	0.071	0.909	0.998	12.23	0.043	0.557	0.617	12.51	0.012	0.189	0.217	13.82
4258.477	0.072	0.919	1.008	12.35	0.042	0.544	0.604	12.24	0.010	0.159	0.187	11.91
4265.418	0.073	0.933	1.022	12.53	0.042	0.544	0.604	12.24	0.011	0.175	0.203	12.93
4266.081	0.073	0.932	1.021	12.51	0.043	0.553	0.613	12.43	0.012	0.189	0.217	13.82
4268.915	0.073	0.929	1.018	12.48	0.043	0.553	0.613	12.43	0.011	0.174	0.202	12.87
4276.836	0.072	0.915	1.004	12.30	0.042	0.541	0.601	12.18	0.010	0.159	0.187	11.91
4284.838	0.072	0.915	1.004	12.30	0.042	0.543	0.603	12.22	0.011	0.176	0.204	12.99
4287.566	0.072	0.913	1.002	12.28	0.042	0.542	0.602	12.20	0.012	0.190	0.218	13.88
4288.310	0.074	0.938	1.027	12.59	0.042	0.541	0.601	12.18	0.010	0.158	0.186	11.85
4290.377	0.073	0.925	1.014	12.43	0.042	0.541	0.601	12.18	0.011	0.174	0.202	12.87
4290.542	0.072	0.911	1.000	12.26	0.042	0.540	0.600	12.16	0.011	0.174	0.202	12.87
4291.630	0.072	0.911	1.000	12.26	0.041	0.526	0.586	11.88	0.011	0.173	0.201	12.80
4294.936	0.073	0.922	1.011	12.39	0.043	0.550	0.610	12.37	0.010	0.158	0.186	11.85

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 6. 1906, May 8, $6^h\ 0^m$ G. M. T. Measured by L. on T. Distance from Limb 2.4 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
$\odot$	47.2	4.3	5.4	84.6	37.8	1.266
$\odot - \Omega$	−27.2	19.3	19.6	70.4	9.9	1.015
P	22.9	34.3	34.4	55.6	5.9	1.005
D	−3.3	49.3	49.4	40.6	4.4	1.003
Diameter	172.1 mm	64.3	64.3	25.7	3.7	1.002
Factor	1.028	79.3	79.3	10.7	3.4	1.002

λ	$\phi = 10°.7$				$\phi = 25°.7$				$\phi = 40°.6$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	....	....	....	....	....	....	....	....	....	....	....	....
4197.257	0.146	1.902	2.038	14.73	0.128	1.670	1.798	14.17	0.097	1.266	1.378	12.88
4203.730	0.146	1.894	2.030	14.67	0.130	1.682	1.810	14.26	0.099	1.288	1.400	13.09
4209.144	0.147	1.904	2.040	14.74	0.130	1.680	1.808	14.25	0.098	1.273	1.385	12.95
4216.136	0.146	1.889	2.025	14.63	0.127	1.644	1.772	13.96	0.097	1.264	1.376	12.87
4220.509	0.148	1.908	2.044	14.77	0.130	1.677	1.805	14.22	0.098	1.270	1.382	12.92
4232.887	0.148	1.903	2.039	14.73	0.130	1.674	1.802	14.20	0.101	1.301	1.413	13.21
4257.815	0.151	1.920	2.056	14.85	0.132	1.680	1.808	14.25	0.102	1.301	1.413	13.21
4258.477	0.150	1.906	2.042	14.75	0.130	1.658	1.786	14.07	0.101	1.283	1.395	13.04
4265.418	0.149	1.892	2.028	14.65	0.130	1.655	1.783	14.05	0.102	1.295	1.407	13.16
4266.081	0.151	1.912	2.048	14.80	0.131	1.664	1.792	14.12	0.102	1.294	1.406	13.15
4268.915	0.151	1.910	2.046	14.78	0.130	1.652	1.780	14.02	0.102	1.292	1.404	13.13
4276.836	0.151	1.908	2.044	14.77	0.132	1.671	1.799	14.17	0.101	1.279	1.391	13.01
4284.838	0.150	1.896	2.032	14.68	0.131	1.658	1.786	14.07	0.102	1.291	1.403	13.12
4287.566	0.150	1.893	2.029	14.66	0.132	1.665	1.793	14.13	0.101	1.278	1.390	13.00
4288.310	0.151	1.903	2.039	14.73	0.131	1.654	1.782	14.04	0.102	1.289	1.401	13.10
4290.377	0.150	1.890	2.026	14.64	0.133	1.675	1.803	14.20	0.101	1.276	1.388	12.98
4290.542	0.150	1.887	2,023	14.62	0.131	1.650	1.778	14.01	0.102	1.287	1.399	13.08
4291.630	0.150	1.886	2.022	14.61	0.132	1.662	1.790	14.10	0.102	1.285	1.397	13.06
4294.936	0.150	1.886	2.022	14.61	0.132	1.662	1.790	14.10	0.102	1.284	1.396	13.05

λ	$\phi = 55°.6$				$\phi = 70°.4$				$\phi = 84°.6$			
4196.699	....	....	....	....	....	....	....	....	0.009	0.153	0.180	13.58
4197.257	0.068	0.890	0.978	12.29	0.039	0.516	0.574	12.15	0.008	0.138	0.165	12.45
4203.730	0.068	0.887	0.975	12.25	0.039	0.514	0.572	12.10	0.010	0.158	0.185	13.96
4209.144	0.067	0.873	0.961	12.08	0.040	0.527	0.585	12.38	0.009	0.154	0.181	13.65
4216.136	0.068	0.883	0.971	12.20	0.038	0.500	0.558	11.81	0.008	0.132	0.159	11.99
4220.509	0.070	0.905	0.993	12.48	0.040	0.524	0.582	12.32	0.011	0.178	0.205	15.46
4232.887	0.069	0.890	0.978	12.29	0.040	0.523	0.581	12.30	0.009	0.151	0.178	13.43
4257.815	0.072	0.919	1.007	12.65	0.042	0.541	0.599	12.68	0.010	0.155	0.182	13.73
4258.477	0.070	0.896	0.984	12.37	0.042	0.540	0.598	12.66	0.010	0.161	0.188	14.18
4265.418	0.071	0.904	0.992	12.46	0.041	0.528	0.586	12.40	0.009	0.148	0.175	13.20
4266.081	0.072	0.916	1.004	12.62	0.042	0.539	0.597	12.63	0.011	0.171	0.198	14.94
4268.915	0.072	0.915	1.003	12.60	0.042	0.539	0.597	12.63	0.008	0.134	0.161	12.14
4276.836	0.072	0.914	1.002	12.59	0.041	0.528	0.586	12.40	0.009	0.148	0.175	13.20
4284.838	0.071	0.900	0.988	12.42	0.041	0.526	0.584	12.36	0.010	0.166	0.193	14.56
4287.566	0.072	0.912	1.000	12.57	0.042	0.538	0.596	12.61	0.009	0.147	0.174	13.13
4288.310	0.071	0.898	0.986	12.39	0.041	0.526	0.584	12.36	0.010	0.153	0.180	13.58
4290.377	0.072	0.910	0.998	12.54	0.041	0.525	0.583	12.34	0.009	0.139	0.166	12.52
4290.542	0.072	0.909	0.997	12.53	0.044	0.560	0.618	13.08	0.009	0.145	0.172	12.98
4291.630	0.072	0.909	0.997	12.53	0.043	0.548	0.606	12.83	0.008	0.128	0.155	11.69
4294.936	0.072	0.909	0.997	12.53	0.043	0.547	0.605	12.80	0.010	0.150	0.177	13.35

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 8. 1906, May 19, $10^h\ 30^m$ G. M. T. Measured by A. on G. Distance from Limb 2.3 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	58.0	14.6	14.7	75.3	8.1	1.010
⊙−☊	−16.4	30.9	31.0	59.0	4.0	1.002
P	19.9	44.6	44.6	45.4	2.9	1.001
D	−2.0	59.6	59.6	30.4	2.4	1.001
Diameter	179.2 mm	74.6	74.6	15.4	2.1	1.001
Factor	1.028	90.9	89.1	0.9	2.0	1.001

λ	$\phi = 0.°9$				$\phi = 15.°4$				$\phi = 30.°4$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.144	1.877	2.016	14.31	0.136	1.767	1.901	14.01	0.116	1.518	1.642	13.52
4197.257	0.150	1.951	2.090	14.84	0.142	1.858	1.992	14.68	0.116	1.521	1.645	13.54
4203.730	....	....	....	....	....	....	....	....	....	....	....	....
4209.144	0.154	2.010	2.149	15.26	0.138	1.779	1.913	14.10	0.116	1.517	1.641	13.51
4216.136	0.144	1.865	2.004	14.23	0.136	1.773	1.907	14.06	0.120	1.561	1.685	13.87
4220.509	0.150	1.944	2.083	14.79	0.140	1.852	1.986	14.64	0.122	1.574	1.698	13.98
4232.887	0.152	1.963	2.102	14.92	0.146	1.920	2.054	15.14	0.126	1.545	1.669	13.74
4257.815	0.148	1.897	2.036	14.46	0.144	1.906	2.040	15.04	0.124	1.590	1.714	14.11
4258.477	0.146	1.871	2.010	14.27	0.142	1.866	2.000	14.74	0.128	1.639	1.763	14.51
4265.418	0.152	1.952	2.091	14.85	0.146	1.908	2.042	15.05	0.120	1.540	1.664	13.70
4266.081	0.152	1.945	2.084	14.80	0.140	1.829	1.963	14.47	0.126	1.601	1.725	14.20
4268.915	0.150	1.930	2.069	14.69	0.136	1.790	1.924	14.18	0.116	1.568	1.692	13.93
4276.836	0.152	1.936	2.075	14.73	0.138	1.818	1.952	14.38	0.118	1.583	1.717	14.13
4284.838	0.156	1.964	2.103	14.93	0.140	1.832	1.966	14.49	0.120	1.601	1.725	14.20
4287.566	0.152	1.918	2.057	14.61	0.144	1.883	2.017	14.87	0.120	1.607	1.731	14.25
4288.310	0.154	1.950	2.089	14.83	0.136	1.768	1.902	14.02	0.122	1.540	1.664	13.70
4290.377	0.148	1.872	2.011	14.28	0.150	1.881	2.015	14.85	0.128	1.613	1.737	14.30
4290.542	0.154	1.948	2.087	14.82	0.148	1.850	1.984	14.62	0.130	1.627	1.751	14.41
4291.630	0.152	1.940	2.079	14.76	0.148	1.850	1.984	14.62	0.130	1.623	1.747	14.38
4294.936	0.146	1.835	1.974	14.02	0.142	1.770	1.904	14.03	0.128	1.598	1.722	14.17

λ	$\phi = 45.°4$				$\phi = 59.°0$				$\phi = 75.°3$			
4196.699	0.100	1.214	1.320	13.35	0.064	0.825	0.908	12.52	0.026	0.334	0.383	10.72
4197.257	0.092	1.189	1.295	13.09	0.066	0.871	0.954	13.15	0.026	0.330	0.379	10.60
4203.730	....	....	....	....	....	....	....	....	....	....	....	....
4209.144	0.096	1.243	1.349	13.64	0.066	0.862	0.945	13.03	0.032	0.392	0.441	12.34
4216.136	0.094	1.212	1.318	13.33	0.068	0.890	0.973	13.41	0.028	0.358	0.407	11.39
4220.509	0.094	1.221	1.327	13.42	0.066	0.874	0.957	13.19	0.030	0.391	0.440	12.31
4232.887	0.092	1.186	1.292	13.06	0.064	0.846	0.929	12.80	0.030	0.393	0.442	12.37
4257.815	0.100	1.279	1.385	14.00	0.072	0.910	0.993	13.69	0.034	0.438	0.487	13.63
4258.477	0.094	1.211	1.317	13.32	0.068	0.873	0.956	13.18	0.032	0.421	0.470	13.15
4265.418	0.098	1.247	1.353	13.68	0.066	0.836	0.919	12.67	0.030	0.383	0.432	12.09
4266.081	0.092	1.175	1.281	12.95	0.064	0.811	0.894	12.32	0.032	0.401	0.450	12.59
4268.915	0.098	1.239	1.345	13.60	0.070	0.900	0.983	13.55	0.032	0.415	0.464	12.98
4276.836	0.096	1.230	1.336	13.51	0.068	0.870	0.953	13.14	0.030	0.389	0.438	12.25
4284.838	0.094	1.197	1.303	13.17	0.070	0.861	0.944	13.01	0.036	0.465	0.514	14.38
4287.566	0.096	1.210	1.316	13.30	0.074	0.890	0.973	13.41	0.034	0.446	0.495	13.85
4288.310	0.098	1.231	1.337	13.52	0.068	0.933	1.016	14.00	0.032	0.432	0.481	13.46
4290.377	0.096	1.219	1.325	13.39	0.070	0.845	0.928	12.79	0.034	0.446	0.495	13.85
4290.542	0.092	1.169	1.275	12.89	0.072	0.874	0.957	13.19	0.026	0.330	0.379	10.60
4291.630	0.096	1.216	1.322	13.36	0.072	0.899	0.982	13.54	0.034	0.432	0.481	13.46
4294.936	0.096	1.219	1.325	13.39	0.072	0.902	0.985	13.58	0.032	0.399	0.448	12.53

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 19. 1906, June 12, $6^h 45^m$ G. M. T. Measured by L. on T. Distance from Limb 2.2 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	80.8	14.9	14.9	75.1	3.1	1.002
⊙−☊	60.4	29.9	29.9	60.1	1.6	1.000
P	11.2	44.9	44.9	45.1	1.1	1.000
D	0.9	59.9	59.9	30.1	0.9	1.000
Diameter	169.1 mm	74.9	74.9	15.1	0.8	1.000
Factor	1.027	89.9	89.9	0.1	0.8	1.000

λ	$\phi = 0.1°$				$\phi = 15.1°$				$\phi = 30.1°$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.150	1.945	2.078	14.75	0.139	1.809	1.941	14.27	0.118	1.533	1.656	13.59
4197.257	0.152	1.970	2.103	14.93	0.140	1.820	1.952	14.35	0.118	1.533	1.656	13.59
4203.730	0.149	1.932	2.065	14.66	0.140	1.817	1.949	14.32	0.122	1.583	1.706	14.00
4209.144	0.148	1.919	2.052	14.57	0.144	1.864	1.996	14.68	0.121	1.567	1.690	13.87
4216.136	0.150	1.937	2.070	14.70	0.137	1.770	1.902	13.99	0.116	1.498	1.621	13.30
4220.509	0.147	1.896	2.029	14.40	0.144	1.817	1.949	14.32	0.119	1.532	1.655	13.58
4232.887	0.156	1.890	2.023	14.36	0.144	1.847	1.979	14.55	0.122	1.565	1.688	13.85
4257.815	0.150	1.904	2.037	14.46	0.140	1.773	1.905	14.01	0.124	1.574	1.697	13.93
4258.477	0.151	1.914	2.047	14.53	0.146	1.848	1.980	14.56	0.123	1.563	1.686	13.84
4265.418	0.152	1.926	2.059	14.62	0.146	1.848	1.980	14.56	0.124	1.571	1.694	13.90
4266.081	0.150	1.901	2.044	14.51	0.143	1.809	1.941	14.27	0.121	1.530	1.653	13.56
4268.915	0.151	1.910	2.043	14.50	0.140	1.769	1.901	13.98	0.124	1.570	1.693	13.89
4276.836	0.152	1.914	2.047	14.53	0.145	1.822	1.954	14.37	0.126	1.588	1.711	14.04
4284.838	0.152	1.910	2.043	14.50	0.145	1.822	1.954	14.37	0.122	1.534	1.657	13.60
4287.566	0.154	1.937	2.070	14.70	0.142	1.782	1.914	14.07	0.124	1.556	1.679	13.78
4288.310	0.153	1.919	0.052	14.57	0.142	1.782	1.914	14.07	0.124	1.556	1.679	13.78
4290.377	0.154	1.932	2.065	14.66	0.141	1.771	1.903	14.00	0.122	1.529	1.652	13.56
4290.542	0.150	1.881	2.014	14.30	0.146	1.830	1.962	14.42	0.125	1.569	1.692	13.88
4291.630	0.152	1.905	2.038	14.47	0.146	1.830	1.962	14.42	0.126	1.574	1.697	13.93
4294.936	0.156	1.954	2.089	14.82	0.144	1.804	1.936	14.23	0.121	1.513	1.636	13.42

λ	$\phi = 45.1°$				$\phi = 60.1°$				$\phi = 75.1°$			
4196.699	0.088	1.145	1.250	12.57	0.058	0.755	0.835	11.89	0.028	0.364	0.414	11.43
4197.257	0.088	1.145	1.250	12.57	0.059	0.768	0.848	12.08	0.028	0.364	0.414	11.43
4203.730	0.091	1.181	1.286	12.93	0.059	0.766	0.846	12.05	0.031	0.403	0.453	12.51
4209.144	0.092	1.191	1.296	13.03	0.061	0.790	0.870	12.38	0.031	0.402	0.452	12.48
4216.136	0.090	1.162	1.267	12.74	0.058	0.751	0.831	11.84	0.030	0.387	0.437	12.07
4220.509	0.092	1.186	1.291	12.98	0.062	0.799	0.879	12.52	0.032	0.413	0.463	12.78
4232.887	0.090	1.155	1.260	12.67	0.063	0.809	0.889	12.66	0.033	0.423	0.473	13.06
4257.815	0.095	1.209	1.314	13.21	0.064	0.814	0.894	12.73	0.034	0.433	0.483	13.34
4258.477	0.094	1.191	1.296	13.03	0.062	0.788	0.868	12.36	0.033	0.419	0.469	12.95
4265.418	0.092	1.166	1.271	12.78	0.063	0.798	0.878	12.50	0.032	0.406	0.456	12.59
4266.081	0.094	1.190	1.295	13.02	0.065	0.824	0.904	12.87	0.034	0.431	0.481	13.28
4268.915	0.093	1.173	1.278	12.85	0.062	0.783	0.863	12.29	0.033	0.418	0.468	12.92
4276.836	0.091	1.149	1.254	12.61	0.062	0.783	0.863	12.29	0.034	0.430	0.480	13.25
4284.838	0.094	1.183	1.288	12.95	0.065	0.817	0.897	12.78	0.033	0.416	0.466	12.87
4287.566	0.094	1.182	1.287	12.94	0.065	0.805	0.885	12.60	0.033	0.415	0.465	12.84
4288.310	0.093	1.169	1.274	12.81	0.064	0.805	0.885	12.60	0.033	0.415	0.465	12.84
4290.377	0.094	1.181	1.286	12.93	0.062	0.779	0.859	12.23	0.033	0.414	0.464	12.81
4290.542	0.094	1.180	1.285	12.92	0.064	0.804	0.884	12.59	0.034	0.427	0.477	13.17
4291.630	0.094	1.179	1.284	12.91	0.064	0.804	0.884	12.59	0.034	0.426	0.476	13.14
4294.936	0.094	1.179	1.284	12.91	0.066	0.827	0.907	12.92	0.032	0.401	0.451	12.45

Table 4.—Results for Individual Plates. Observations of 1906–1907—Continued.

Plate ω 20. 1906, June 12, $7^h\ 15^m$ G. M. T. Measured by L. on T. Distance from Limb 2.2 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
☉	80.9					
☉−☊	6.5	29.9	29.9	60.1	1.6	1.000
P	11.1	44.9	44.9	45.1	1.1	1.000
D	0.9	59.9	59.9	30.1	0.9	1.000
Diameter	169.1 mm	74.9	74.9	15.1	0.8	1.000
Factor	1.027	89.9	89.9	0.1	0.8	1.000

λ	$\phi = 0°.1$				$\phi = 15°.1$				$\phi = 30°.1$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.146	1.901	2.034	14.44	0.137	1.779	1.911	14.05	0.116	1.508	1.631	13.38
4197.257	0.147	1.911	2.044	14.51	0.139	1.800	1.932	14.21	0.119	1.544	1.667	13.68
4203.730	0.152	1.971	2.104	14.94	0.141	1.822	1.954	14.37	0.121	1.566	1.689	13.86
4209.144	0.151	1.950	2.083	14.79	0.140	1.806	1.938	14.25	0.122	1.575	1.698	13.93
4216.136	0.148	1.910	2.043	14.50	0.138	1.782	1.914	14.07	0.118	1.523	1.646	13.51
4220.509	0.150	1.935	2.068	14.68	0.142	1.826	1.958	14.40	0.118	1.521	1.644	13.49
4232.887	0.154	1.975	2.108	14.97	0.142	1.820	1.952	14.35	0.122	1.563	1.686	13.84
4257.815	0.156	1.982	2.115	15.02	0.144	1.828	1.960	14.41	0.124	1.575	1.698	13.93
4258.477	0.152	1.929	2.062	14.64	0.143	1.813	1.945	14.30	0.122	1.550	1.673	13.73
4265.418	0.153	1.939	2.072	14.71	0.140	1.772	1.904	14.00	0.121	1.530	1.653	13.56
4266.081	0.153	1.939	2.072	14.71	0.144	1.817	1.949	14.32	0.123	1.551	1.674	13.74
4268.915	0.152	1.924	2.057	14.60	0.143	1.805	1.937	14.24	0.122	1.539	1.662	13.64
4276.836	0.154	1.945	2.078	14.75	0.143	1.803	1.935	14.23	0.122	1.537	1.660	13.62
4284.838	0.150	1.890	2.023	14.36	0.142	1.786	1.918	14.10	0.124	1.559	1.682	13.80
4287.566	0.152	1.910	2.043	14.50	0.142	1.781	1.913	14.07	0.122	1.530	1.653	13.56
4288.310	0.154	1.931	2.064	14.65	0.144	1.805	1.937	14.24	0.121	1.519	1.642	13.47
4290.377	0.152	1.909	2.042	14.49	0.142	1.780	1.912	14.06	0.120	1.508	1.631	13.38
4290.542	0.153	1.920	2.053	14.58	0.143	1.794	1.926	14.16	0.120	1.504	1.627	13.35
4291.630	0.152	1.909	2.042	14.49	0.142	1.780	1.912	14.06	0.122	1.528	1.651	13.55
4294.936	0.156	1.954	2.087	14.82	0.140	1.753	1.885	13.86	0.121	1.517	1.640	13.46

λ	$\phi = 45°.1$				$\phi = 60°.1$			
4196.699	0.086	1.116	1.221	12.28	0.056	0.730	0.810	11.54
4197.257	0.088	1.141	1.246	12.53	0.058	0.752	0.832	11.85
4203.730	0.090	1.165	1.270	12.77	0.059	0.765	0.845	12.03
4209.144	0.091	1.178	1.283	12.90	0.060	0.775	0.855	12.18
4216.136	0.088	1.136	1.241	12.48	0.058	0.749	0.829	11.81
4220.509	0.089	1.145	1.250	12.57	0.062	0.799	0.879	12.52
4232.887	0.092	1.179	1.284	12.91	0.062	0.797	0.877	12.49
4257.815	0.096	1.217	1.322	13.29	0.066	0.839	0.919	13.09
4258.477	0.094	1.193	1.298	13.05	0.064	0.813	0.893	12.72
4265.418	0.091	1.151	1.256	12.63	0.063	0.801	0.881	12.55
4266.081	0.096	1.215	1.320	13.27	0.065	0.823	0.903	12.86
4268.915	0.093	1.175	1.280	12.87	0.063	0.797	0.877	12.49
4276.836	0.093	1.173	1.278	12.85	0.062	0.785	0.865	12.32
4284.838	0.092	1.159	1.262	12.69	0.061	0.770	0.850	12.11
4287.566	0.090	1.132	1.237	12.42	0.064	0.804	0.884	12.59
4288.310	0.094	1.181	1.286	12.93	0.062	0.779	0.859	12.23
4290.377	0.091	1.141	1.246	12.53	0.063	0.790	0.870	12.39
4290.542	0.091	1.141	1.246	12.53	0.062	0.775	0.855	12.18
4291.630	0.091	1.141	1.246	12.53	0.064	0.799	0.879	12.52
4294.936	0.094	1.179	1.284	12.91	0.063	0.789	0.869	12.38

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 21. 1906, June 12, $7^h\ 45^m$ G. M. T. Measured by L. on T. Distance from Limb 2.2 mm. Quality, good.

⊙	80°.9
⊙ − ☊	6.5
P	11.1
D	0.9
Diameter	169.1 mm
Factor	1.027

$p-P$	π	ϕ	η	sec η
°	°	°	°	
14.9	14.9	75.1	3.2	1.002
29.9	29.9	60.1	1.6	1.000
44.9	44.9	45.1	1.1	1.000
59.9	59.9	30.1	0.9	1.000
73.9	73.9	16.1	0.8	1.000
74.9	74.9	15.1	0.8	1.000
89.9	89.9	0.1	0.8	1.000

λ	$\phi = 0°.1$				$\phi = 15°.1$				$\phi = 16°.1$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.146	1.897	2.030	14.41	0.138	1.794	1.926	14.16	0.137	1.780	1.912	14.13
4197.257	0.148	1.923	2.056	14.60	0.139	1.801	1.933	14.21	0.138	1.790	1.922	14.20
4203.730	0.149	1.934	2.067	14.67	0.141	1.823	1.955	14.38	0.140	1.812	1.944	14.36
4209.144	0.152	1.963	2.096	14.88	0.142	1.831	1.963	14.21	0.139	1.796	1.928	14.24
4216.136	0.148	1.910	2.043	14.50	0.139	1.793	1.925	14.16	0.138	1.779	1.911	14.12
4220.509	0.150	1.934	2.067	14.67	0.140	1.801	1.933	14.21	0.139	1.791	1.923	14 21
4232.887	0.152	1.942	2.075	14.73	0.143	1.822	1.954	14.37	0.143	1.833	1.965	14.52
4257.815	0.154	1.953	2.086	14.81	0.143	1.825	1.957	14.39	0.145	1.840	1.972	14.57
4258.477	0.152	1.928	2.061	14.63	0.142	1.800	1.932	14.21	0.143	1.815	1.947	14.38
4265.418	0.154	1.949	2.082	14.78	0.144	1.822	1.954	14.37	0.144	1.823	1.955	14.44
4266.081	0.152	1.924	2.057	14.60	0.143	1.808	1.940	14.27	0.142	1.805	1.937	14.31
4268.915	0.150	1.898	2.031	14.42	0.143	1.803	1.935	14.23	0.144	1.822	1.954	14.44
4276.836	0.153	1.930	2.063	14.65	0.145	1.824	1.956	14.38	0.142	1.794	1.926	14.23
4284.838	0.153	1.923	2.056	14.60	0.142	1.786	1.918	14.10	0.144	1.815	1.947	14.38
4287.566	0.154	1.936	2.069	14.69	0.143	1.795	1.927	14.17	0.146	1.835	1.967	14.53
4288.310	0.154	1.935	2.068	14.68	0.143	1.795	1.927	14.17	0.140	1.760	1.892	13.98
4290.377	0.150	1.885	2.018	14.33	0.145	1.819	1.951	14.35	0.143	1.794	1.926	14.23
4290.542	0.152	1.907	2.040	14.48	0.142	1.780	1.912	14.06	0.142	1.784	1.916	14.16
4291.630	0.153	1.920	2.053	14.58	0.144	1.804	1.936	14.24	0.144	1.809	1.941	14.34
4294.936	0.154	1.929	2.062	14.64	0.141	1.768	1.900	13.97	0.145	1.818	1.950	14.41

λ	$\phi = 30°.1$				$\phi = 45°.1$				$\phi = 60°.1$				$\phi = 75°.1$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.116	1.515	1.638	13.44	0.088	1.146	1.251	12.58	0.056	0.727	0.807	11.49	0.027	0.354	0.404	11.15
4197.257	0.120	1.555	1.678	13.77	0.087	1.131	1.236	12.43	0.058	0.749	0.829	11.81	0.029	0.375	0.425	11.73
4203.730	0.120	1.552	1.675	13.74	0.090	1.165	1.270	12.77	0.061	0.788	0.868	12.36	0.030	0.389	0.439	12.12
4209.144	0.120	1.550	1.673	13.73	0.090	1.164	1.269	12.76	0.061	0.787	0.867	12.35	0.030	0.389	0.439	12.12
4216.136	0.118	1.523	1.646	13.51	0.090	1.162	1.267	12.74	0.057	0.735	0.815	11.61	0.029	0.374	0.424	11.71
4220.509	0.120	1.546	1.669	13.70	0.090	1.161	1.266	12.73	0.060	0.774	0.854	12.16	0.031	0.398	0.448	12.37
4232.887	0.121	1.552	1.675	13.75	0.095	1.213	1.318	13.26	0.061	0.779	0.859	12.23	0.032	0.423	0.473	13.04
4257.815	0.124	1.568	1.691	13.88	0.098	1.244	1.349	13.57	0.064	0.810	0.890	12.68	0.034	0.438	0.488	13.47
4258.477	0.122	1.543	1.666	13.67	0.093	1.189	1.294	13.01	0.062	0.785	0.865	12.32	0.034	0.409	0.459	12.67
4265.418	0.122	1.541	1.664	13.65	0.094	1.187	1.292	12.99	0.062	0.784	0.864	12.30	0.032	0.404	0.454	12.54
4266.081	0.123	1.555	1.678	13.78	0.092	1.166	1.271	12.78	0.064	0.808	0.888	12.65	0.031	0.434	0.484	13.36
4268.915	0.121	1.529	1.652	13.56	0.092	1.165	1.270	12.77	0.060	0.759	0.839	11.95	0.034	0.454	0.504	13.92
4276.836	0.122	1.537	1.660	13.62	0.093	1.174	1.279	12.86	0.064	0.806	0.886	12.62	0.032	0.419	0.469	12.95
4284.838	0.121	1.524	1.647	13.52	0.094	1.182	1.287	12.94	0.062	0.784	0.864	12.30	0.032	0.403	0.453	12.51
4287.566	0.122	1.530	1.653	13.56	0.093	1.167	1.272	12.79	0.064	0.801	0.881	12.55	0.034	0.428	0.478	13.20
4288.310	0.122	1.529	1.652	13.56	0.092	1.157	1.262	12.69	0.062	0.779	0.859	12.23	0.034	0.428	0.478	13.20
4290.377	0.126	1.578	1.701	13.96	0.093	1.167	1.272	12.79	0.061	0.769	0.849	12.09	0.032	0.402	0.452	12.48
4290.542	0.123	1.543	1.666	13.67	0.091	1.146	1.251	12.58	0.064	0.800	0.880	12.53	0.031	0.388	0.438	12.09
4291.630	0.124	1.553	1.676	13.75	0.090	1.131	1.236	12.43	0.063	0.789	0.869	12.38	0.034	0.428	0.478	13.20
4294.936	0.122	1.527	1.650	13.54	0.092	1.155	1.260	12.67	0.062	0.779	0.859	12.23	0.034	0.427	0.477	13.17

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 23. 1906, June 15, 6^h 0^m G. M. T. Measured by L. on T. Distance from Limb 2.3 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	83.7	15.0	15.0	75.0	4.5	1.003
⊙−☊	9.3	31.0	31.0	59.0	2.3	1.001
P	9.9	45.0	45.0	45.0	1.7	1.000
D	1.2	60.0	60.0	30.0	1.4	1.000
Diameter	169.3 mm	75.0	75.0	15.0	1.2	1.000
Factor	1.028	90.0	90.0	0.0	1.2	1.000

λ	$\phi = 0°.0$				$\phi = 15°.0$				$\phi = 30°.0$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.146	1.900	2.033	14.43	0.138	1.797	1.929	14.18	0.118	1.536	1.659	13.60
4197.257	0.148	1.925	2.058	14.61	0.138	1.797	1.929	14.18	0.119	1.547	1.670	13.69
4203.730	0.149	1.936	2.069	14.69	0.140	1.815	1.947	14.31	0.119	1.545	1.668	13.67
4209.144	0.150	1.913	2.046	14.53	0.141	1.824	1.956	14.38	0.121	1.567	1.690	13.85
4216.136	0.148	1.893	2.026	14.38	0 138	1.785	1.917	14.09	0.118	1.526	1.649	13.52
4220.509	0.150	1.903	2.036	14.45	0.140	1.808	1.940	14.26	0.118	1.524	1.647	13.50
4232.887	0.150	1.903	2.036	14.45	0.142	1.825	1.957	14.38	0.122	1.566	1.689	13.85
4257.815	0.152	1.930	2.063	14.65	0.143	1.817	1.949	14.33	0.122	1.547	1.670	13.69
4258.477	0.153	1.948	2.081	14.77	0.143	1.817	1.949	14.33	0.123	1.557	1.680	13.77
4265.418	0.154	1.952	2.085	14.80	0.145	1.832	1.964	14.44	0.122	1.544	1.667	13.67
4266.081	0.152	1.926	2.059	14.62	0.142	1.800	1.932	14.20	0.123	1.554	1.677	13.75
4268.915	0.153	1.935	2.068	14.68	0.144	1.820	1.952	14.35	0.124	1.571	1.694	13.88
4276.836	0.156	1.969	2.102	14.92	0.140	1.768	1.900	13.96	0.121	1.526	1.649	13.52
4284.838	0.153	1.928	2.061	14.63	0.142	1.786	1.918	14.10	0.123	1.548	1.671	13.70
4287.566	0.153	1.927	2.060	14.62	0.143	1.798	1.930	14.18	0.121	1.522	1.645	13.49
4288.310	0.152	1.909	2.042	14.50	0.143	1.798	1.930	14.18	0.123	1.546	1.669	13.68
4290.377	0.152	1.909	2.042	14.50	0.142	1.783	1.915	14.08	0.124	1.560	1.683	13.80
4290.542	0.151	1.898	2.031	14.42	0.142	1.783	1.915	14.08	0.122	1.535	1.658	13.59
4291.630	0.152	1.907	2.040	14.48	0.144	1.807	1.939	14.25	0.123	1.545	1.668	13.67
4294.936	0.152	1.907	2.040	14.48	0.142	1.781	1.912	14.05	0.124	1.558	1.681	13.78
	$\phi = 45°.0$				$\phi = 59°.0$				$\phi = 75°.0$			
4196.699	0.087	1.132	1.237	12.42	0.057	0.743	0.825	11.37	0.029	0.380	0.430	11.80
4197.257	0.090	1.163	1.268	12.73	0.057	0.743	0.825	11.37	0.030	0.391	0.441	12 10
4203.730	0.088	1.145	1.250	12.55	0.059	0.766	0.848	11.69	0.028	0.365	0.415	11.38
4209.144	0.092	1.191	1.296	13.01	0.060	0.776	0.858	11.83	0.030	0.389	0.439	12.04
4216.136	0.087	1.122	1.227	12.32	0.058	0.750	0.832	11.47	0.029	0.378	0.428	11.74
4220.509	0.088	1.137	1.242	12.47	0.061	0.787	0.869	11.98	0.030	0.388	0.438	12.01
4232.887	0.090	1.154	1.259	12.64	0.062	0.799	0.881	12.14	0.031	0.398	0.448	12.29
4257.815	0.092	1.170	1.275	12.80	0.062	0.791	0.873	12.03	0.031	0.396	0.446	12.23
4258.477	0.094	1.195	1.300	13.05	0.062	0.791	0.873	12.03	0.030	0.379	0.429	11.77
4265.418	0.092	1.165	1.270	12.75	0.063	0.800	0.882	12.16	0.032	0.386	0.436	11.96
4266.081	0.090	1.139	1.244	12.49	0.062	0.789	0.871	12.01	0.034	0.431	0.481	13.19
4268.915	0.091	1.151	1.256	12.61	0.058	0.734	0.816	11.25	0.032	0.405	0.455	12.48
4276.836	0.092	1.161	1.266	12.71	0.062	0.787	0.869	11.98	0.032	0.405	0.455	12.48
4284.838	0.094	1.184	1.289	12.94	0.063	0.793	0.875	12.06	0.031	0.393	0.443	12.15
4287.566	0.092	1.158	1.263	12.68	0.061	0.766	0.848	11.69	0.031	0.393	0.443	12.15
4288.310	0.093	1.164	1.269	12.74	0.062	0.780	0.862	11.88	0.031	0.393	0.443	12.15
4290.377	0.089	1.116	1.221	12.26	0.062	0.779	0.861	11.87	0.032	0.403	0.453	12.43
4290.542	0.090	1.131	1.236	12.41	0.060	0.755	0.837	11.54	0.032	0.403	0.453	12.43
4291.630	0.094	1.182	1.287	12.91	0.061	0.765	0.847	11.68	0.032	0.403	0.453	12.43
4294.936	0.090	1.130	1.235	12.40	0.065	0.815	0.897	12.36	0.031	0.389	0.439	12.04

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 24. 1906, June 15, 6^h 15^m G. M. T. Measured by L. on T. Distance from Limb 2.4 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	83.7	15.0	15.0	75.0	4.5	1.003
⊙ − ☊	9.3	30.0	30.0	60.0	2.2	1.001
P	9.9	45.0	45.0	45.0	1.7	1.000
D	1.2	60.0	60.0	30.0	1.4	1.000
Diameter	169.5 mm	75.0	75.0	15.0	1.2	1.000
Factor	1.030	90.0	90.0	0.0	1.2	1.000

λ	$\phi = 0°.0$				$\phi = 15°.0$				$\phi = 30°.0$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.148	1.923	2.056	14.60	0.138	1.795	1.927	14.16	0.118	1.540	1.663	13.63
4197.257	0.147	1.912	2.045	14.52	0.138	1.795	1.927	14.16	0.117	1.525	1.648	13.51
4203.730	0.150	1.946	2.079	14.76	0.138	1.792	1.924	14.14	0.121	1.575	1.698	13.92
4209.144	0.150	1.944	2.077	14.75	0.140	1.815	1.947	14.31	0.120	1.558	1.681	13.78
4216.136	0.146	1.890	2.023	14.36	0.138	1.790	1.922	14.13	0.118	1.528	1.651	13.53
4220.509	0.150	1.940	2.073	14.72	0.141	1.821	1.953	14.35	0.122	1.581	1.704	13.97
4232.887	0.152	1.955	2.088	14.82	0.142	1.827	1.959	14.40	0.122	1.571	1.694	13.89
4257.815	0.153	1.951	2.084	14.79	0.145	1.848	1.980	14.55	0.122	1.553	1.676	13.74
4258.477	0.154	1.958	2.091	14.85	0.142	1.805	1.937	14.24	0.121	1.541	1.664	13.64
4265.418	0.155	1.969	2.102	14.92	0.142	1.802	1.934	14.21	0.123	1.562	1.685	13.81
4266.081	0.153	1.939	2.072	14.71	0.143	1.816	1.948	14.32	0.121	1.537	1.660	13.61
4268.915	0.153	1.937	2.070	14.70	0.142	1.801	1.933	14.21	0.122	1.548	1.671	13.70
4276.836	0.152	1.923	2.056	14.60	0.144	1.822	1.954	14.36	0.123	1.555	1.678	13.76
4284.838	0.153	1.931	2.064	14.65	0.142	1.788	1.920	14.11	0.123	1.551	1.674	13.72
4287.566	0.153	1.926	2.059	14.62	0.144	1.814	1.946	14.30	0.122	1.536	1.659	13.60
4288.310	0.155	1.951	2.084	14.80	0.143	1.800	1.932	14.20	0.124	1.560	1.683	13.80
4290.377	0.151	1.900	2.033	14.43	0.142	1.785	1.917	14.09	0.123	1.547	1.670	13.69
4290.542	0.152	1.911	2.044	14.51	0.143	1.799	1.931	14.19	0.122	1.535	1.658	13.59
4291.630	0.153	1.924	2.057	14.60	0.142	1.785	1.917	14.09	0.125	1.571	1.694	13.89
4294.936	0.152	1.909	2.042	14.50	0.144	1.808	1.940	14.26	0.124	1.555	1.678	13.76

λ	$\phi = 45°.0$				$\phi = 60°.0$				$\phi = 75°.0$			
4196.699	0.089	1.162	1.267	12.72	0.060	0.779	0.861	12.23	0.028	0.366	0.416	11.41
4197.257	0.088	1.147	1.252	12.57	0.058	0.754	0.836	11.87	0.028	0.366	0.416	11.41
4203.730	0.090	1.172	1.277	12.82	0.060	0.778	0.860	12.21	0.030	0.390	0.440	12.07
4209.144	0.091	1.182	1.287	12.92	0.059	0.763	0.845	12.00	0.031	0.400	0.450	12.34
4216.136	0.088	1.140	1.245	12.50	0.058	0.751	0.833	11.83	0.030	0.389	0.439	12.04
4220.509	0.090	1.164	1.269	12.74	0.060	0.777	0.859	12.20	0.030	0.389	0.439	12.04
4232.887	0.091	1.172	1.277	12.82	0.062	0.800	0.882	12.52	0.032	0.412	0.462	12.67
4257.815	0.092	1.171	1.276	12.81	0.066	0.841	0.923	13.11	0.034	0.431	0.481	13.19
4258.477	0.091	1.159	1.264	12.69	0.062	0.789	0.871	12.37	0.033	0.420	0.470	12.89
4265.418	0.093	1.181	1.286	12.91	0.064	0.815	0.897	12.74	0.033	0.420	0.470	12.89
4266.081	0.094	1.194	1.299	13.04	0.062	0.787	0.869	12.34	0.033	0.420	0.470	12.89
4268.915	0.092	1.167	1.272	12.77	0.062	0.787	0.869	12.34	0.032	0.405	0.455	12.48
4276.836	0.092	1.164	1.269	12.74	0.063	0.800	0.882	12.52	0.031	0.394	0.444	12.18
4284.838	0.090	1.135	1.240	12.45	0.062	0.782	0.864	12.37	0.031	0.393	0.443	12.15
4287.566	0.093	1.170	1.275	12.80	0.065	0.816	0.898	12.75	0.035	0.441	0.491	13.47
4288.310	0.092	1.158	1.263	12.68	0.063	0.792	0.874	12.41	0.032	0.404	0.454	12.45
4290.377	0.094	1.182	1.287	12.92	0.060	0.762	0.844	11.98	0.032	0.404	0.454	12.45
4290.542	0.093	1.170	1.275	12.80	0.062	0.781	0.863	12.25	0.033	0.414	0.464	12.73
4291.630	0.093	1.169	1.274	12.79	0.066	0.831	0.913	12.96	0.032	0.403	0.453	12.43
4294.936	0.094	1.179	1.284	12.89	0.064	0.806	0.888	12.61	0.032	0.403	0.453	12.43

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 25. 1906, June 15, $6^h\,35^m$ G. M. T. Measured by L. on T. Distance from Limb 2.3 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	83.7	15.0	15.0	75.0	4.5	1.003
⊙−☊	9.3	30.0	30.0	60.0	2.3	1.001
P	9.9	45.0	45.0	45.0	1.7	1.000
D	1.2	60.0	60.0	30.0	1.4	1.000
Diameter	169.5 mm	75.0	75.0	15.0	1.2	1.000
Factor	1.030	90.0	90.0	0.0	1.2	1.000

λ	$\phi = 0°.0$				$\phi = 15°.0$				$\phi = 30°.0$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.149	1.943	2.076	14.74	0.139	1.810	1.942	14.27	0.118	1.537	1.660	13.61
4197.257	0.150	1.957	2.090	14.84	0.142	1.847	1.979	14.55	0.120	1.564	1.687	13.83
4203.730	0.151	1.965	2.098	14.89	0.144	1.869	2.001	14.71	0.118	1.540	1.663	13.63
4209.144	0.154	1.989	2.122	15.06	0.144	1.867	1.999	14.69	0.127	1.651	1.774	14.54
4216.136	0.146	1.889	2.022	14.36	0.141	1.823	1.955	14.37	0.116	1.502	1.625	13.32
4220.509	0.150	1.937	2.070	14.70	0.146	1.887	2.019	14.84	0.125	1.614	1.737	14.24
4232.887	0.151	1.943	2.076	14.74	0.144	1.853	1.985	14.59	0.120	1.542	1.665	13.65
4257.815	0.150	1.911	2.044	14.51	0.145	1.843	1.975	14.52	0.124	1.576	1.699	13.93
4258.477	0.155	1.961	2.094	14.87	0.145	1.843	1.975	14.52	0.120	1.526	1.649	13.52
4265.418	0.147	1.867	2.000	14.20	0.146	1.854	1.986	14.60	0.125	1.586	1.709	14.01
4266.081	0.151	1.917	2.050	14.55	0.148	1.878	2.010	14.77	0.120	1.524	1.647	13.50
4268.915	0.152	1.927	2.060	14.62	0.146	1.851	1.983	14.58	0.121	1.530	1.653	13.55
4276.836	0.151	1.909	2.042	14.50	0.143	1.808	1.940	14.26	0.122	1.541	1.664	13.64
4284.838	0.154	1.941	2.074	14.72	0.144	1.818	1.950	14.33	0.122	1.538	1.661	13.62
4287.566	0.154	1.936	2.069	14.69	0.146	1.839	1.971	14.49	0.119	1.499	1.622	13.30
4288.310	0.153	1.925	2.058	14.61	0.142	1.777	1.909	14.03	0.117	1.474	1.597	13.09
4290.377	0.152	1.911	2.044	14.51	0.138	1.738	1.870	13.74	0.120	1.508	1.631	13.37
4290.542	0.153	1.921	2.054	14.58	0.142	1.776	1.908	14.02	0.122	1.533	1.656	13.58
4291.630	0.150	1.888	2.021	14.35	0.142	1.776	1.908	14.02	0.119	1.497	1.620	13.28
4294.936	0.152	1.909	2.042	14.50	0.144	1.808	1.940	14.26	0.121	1.517	1.640	13.44

λ	$\phi = 45°.0$				$\phi = 60°.0$				$\phi = 75°.0$			
4196.699	0.087	1.135	1.240	12.45	0.054	0.703	0.785	11.15	0.026	0.340	0.390	10.63
4197.257	0.088	1.147	1.252	12.57	0.059	0.769	0.851	12.08	0.035	0.442	0.492	13.41
4203.730	0.086	1.120	1.225	12.30	0.063	0.819	0.901	12.79	0.032	0.416	0.466	12.70
4209.144	0.090	1.169	1.274	12.79	0.066	0.855	0.937	13.30	0.031	0.405	0.455	12.40
4216.136	0.086	1.114	1.219	12.24	0.053	0.685	0.767	10.89	0.025	0.324	0.374	10.19
4220.509	0.096	1.242	1.347	13.52	0.058	0.748	0.830	11.79	0.031	0.342	0.392	10.68
4232.887	0.093	1.197	1.302	13.07	0.062	0.798	0.880	12.50	0.032	0.411	0.461	12.56
4257.815	0.092	1.171	1.276	12.81	0.062	0.790	0.872	12.38	0.034	0.447	0.497	13.54
4258.477	0.090	1.145	1.250	12.55	0.060	0.764	0.846	12.01	0.027	0.345	0.395	10.76
4265.418	0.086	1.092	1.197	12.02	0.064	0.759	0.841	11.94	0.031	0.394	0.444	12.10
4266.081	0.096	1.220	1.325	13.30	0.061	0.776	0.858	12.18	0.026	0.331	0.381	10.38
4268.915	0.091	1.155	1.260	12.65	0.065	0.776	0.858	12.18	0.032	0.406	0.456	12.43
4276.836	0.090	1.138	1.243	12.48	0.063	0.800	0.882	12.52	0.032	0.406	0.456	12.43
4284.838	0.095	1.095	1.200	12.05	0.068	0.857	0.939	13.33	0.028	0.354	0.404	11.01
4287.566	0.092	1.158	1.263	12.68	0.066	0.832	0.914	12.98	0.030	0.378	0.428	11.66
4288.310	0.091	1.145	1.250	12.55	0.057	0.717	0.799	11.35	0.029	0.364	0.414	11.28
4290.377	0.096	1.207	1.312	13.17	0.064	0.807	0.889	12.62	0.037	0.465	0.515	14.04
4290.542	0.092	1.157	1.262	12.67	0.062	0.782	0.864	12.27	0.028	0.373	0.423	11.53
4291.630	0.097	1.219	1.324	13.29	0.059	0.742	0.824	11.70	0.029	0.364	0.414	11.28
4294.936	0.097	1.217	1.322	13.27	0.064	0.802	0.884	12.55	0.028	0.353	0.403	10.98

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 26. 1906, June 16, $6^h\ 20^m$ G. M. T. Measured by L. on T. Distance from Limb 2.7 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	84.5	15.0	15.1	74.9	4.9	1.004
⊙−☊	10.1	30.0	30.0	60.0	2.5	1.001
P	9.5	45.0	45.0	45.0	1.8	1.001
D	1.3	60.0	60.0	30.0	1.5	1.000
Diameter	170.0 mm	75.0	75.0	15.0	1.3	1.000
Factor	1.033	90.0	90.0	0.0	1.3	1.000

λ	$\phi = 0.0°$				$\phi = 15.0°$				$\phi = 30.0°$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.150	1.956	2.089	14.83	0.138	1.804	1.936	14.22	0.114	1.491	1.614	13.22
4197.257	0.148	1.936	2.069	14.69	0.138	1.803	1.935	14.22	0.115	1.501	1.624	13.30
4203.730	0.148	1.931	2.064	14.65	0.144	1.878	2.010	14.77	0.116	1.509	1.632	13.37
4209.144	0.152	1.972	2.105	14.94	0.144	1.876	2.008	14.75	0.120	1.558	1.681	13.77
4216.136	0.147	1.910	2.043	14.50	0.137	1.777	1.909	14.02	0.112	1.455	1.578	12.92
4220.509	0.147	1.910	2.043	14.50	0.144	1.867	1.999	14.69	0.122	1.581	1.704	13.96
4232.887	0.152	1.963	2.096	14.88	0.144	1.858	1.990	14.62	0.121	1.562	1.685	13.80
4257.815	0.159	2.030	2.163	15.36	0.144	1.848	1.980	14.55	0.118	1.506	1.629	13.34
4258.477	0.155	1.978	2.111	14.99	0.147	1.876	2.008	14.75	0.120	1.527	1.650	13.51
4265.418	0.152	1.936	2.069	14.69	0.145	1.848	1.980	14.55	0.123	1.565	1.688	13.82
4266.081	0.152	1.935	2.068	14.68	0.146	1.858	1.990	14.62	0.118	1.503	1.626	13.32
4268.915	0.152	1.934	2.067	14.67	0.150	1.907	2.039	14.98	0.116	1.476	1.599	13.10
4276.836	0.151	1.912	2.045	14.52	0.144	1.823	1.955	14.36	0.120	1.520	1.643	13.46
4284.838	0.154	1.945	2.078	14.75	0.148	1.867	1.999	14.69	0.116	1.475	1.598	13.09
4287.566	0.151	1.907	2.040	14.48	0.148	1.867	1.999	14.69	0.122	1.538	1.661	13.60
4288.310	0.150	1.904	2.037	14.46	0.149	1.880	2.012	14.78	0.117	1.481	1.604	13.14
4290.377	0.155	1.964	2.097	14.89	0.142	1.790	1.922	14.12	0.118	1.491	1.614	13.22
4290.542	0.154	1.942	2.075	14.73	0.144	1.815	1.947	14.30	0.120	1.512	1.635	13.39
4291.630	0.148	1.868	2.001	14.21	0.146	1.841	1.973	14.49	0.121	1.522	1.645	13.47
4294.936	0.157	1.976	2.109	14.97	0.144	1.811	1.943	14.27	0.120	1.510	1.633	13.37

λ	$\phi = 45.0°$				$\phi = 60.0°$				$\phi = 74.9°$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
4196.699	0.087	1.136	1.241	12.45	0.060	0.787	0.867	12.27	0.033	0.434	0.484	13.19
4197.257	0.086	1.126	1.231	12.35	0.058	0.761	0.841	11.91	0.030	0.393	0.443	12.07
4203.730	0.088	1.145	1.250	12.54	0.061	0.796	0.876	12.40	0.031	0.407	0.457	12.45
4209.144	0.093	1.206	1.311	13.14	0.060	0.782	0.862	12.20	0.036	0.469	0.519	14.14
4216.136	0.088	1.142	1.247	12.51	0.065	0.846	0.926	13.11	0.030	0.391	0.441	12.02
4220.509	0.093	1.203	1.308	13.12	0.061	0.793	0.873	12.36	0.030	0.390	0.440	11.99
4232.887	0.090	1.160	1.265	12.69	0.062	0.801	0.881	12.47	0.034	0.438	0.488	13.30
4257.815	0.090	1.150	1.255	12.59	0.054	0.732	0.812	11.49	0.030	0.383	0.433	11.80
4258.477	0.092	1.174	1.279	12.83	0.065	0.830	0.913	12.92	0.035	0.445	0.495	13.49
4265.418	0.090	1.148	1.253	12.57	0.059	0.753	0.833	11.79	0.030	0.382	0.432	11.77
4266.081	0.095	1.209	1.314	13.18	0.063	0.803	0.883	12.50	0.032	0.409	0.459	12.51
4268.915	0.094	1.197	1.302	13.06	0.060	0.763	0.843	11.93	0.035	0.444	0.494	13.46
4276.836	0.092	1.166	1.271	12.75	0.063	0.801	0.881	12.47	0.028	0.382	0.432	11.77
4284.838	0.092	1.163	1.268	12.72	0.057	0.716	0.796	11.27	0.034	0.431	0.481	13.11
4287.566	0.093	1.173	1.278	12.82	0.068	0.860	0.940	13.31	0.034	0.431	0.481	13.11
4288.310	0.095	1.199	1.304	13.08	0.061	0.770	0.850	12.03	0.030	0.380	0.430	11.72
4290.377	0.092	1.159	1.264	12.68	0.061	0.769	0.849	12.02	0.032	0.406	0.456	12.43
4290.542	0.094	1.183	1.288	12.92	0.057	0.719	0.799	11.31	0.031	0.391	0.441	12.02
4291.630	0.094	1.183	1.288	12.92	0.058	0.733	0.813	11.51	0.028	0.355	0.405	11.04
4294.936	0.096	1.207	1.312	13.16	0.064	0.804	0.884	12.51	0.030	0.379	0.429	11.69

TABLE 4. — RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907 — Continued.

Plate ω 27. 1906, June 16, $7^h\ 5^m$ G. M. T. Measured by L. on T. Distance from Limb 2.7 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
		°	°	°	°	
⊙	84.6	15.0	15.1	74.9	4.9	1.004
⊙–☊	10.2	30.0	30.0	60.0	2.5	1.001
P	9.5	45.0	45.0	45.0	1.8	1.001
D	1.3	60.0	60.0	30.0	1.5	1.000
Diameter	170.0 mm	75.0	75.0	15.0	1.3	1.000
Factor	1.033	90.0	90.0	0.0	1.3	1.000

λ	$\phi = 0\overset{\circ}{.}0$				$\phi = 15\overset{\circ}{.}0$				$\phi = 30\overset{\circ}{.}0$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.152	1.990	2.123	15.07	0.136	1.779	1.911	14.04	0.114	1.491	1.614	13.23
4197.257	0.146	1.909	2.042	14.50	0.134	1.753	1.885	13.85	0.116	1.516	1.639	13.44
4203.730	0.146	1.906	2.039	14.48	0.137	1.785	1.917	14.09	0.119	1.552	1.675	13.73
4209.144	0.148	1.928	2.061	14.63	0.142	1.851	1.983	14.58	0.122	1.584	1.707	13.99
4216.136	0.150	1.949	2.082	14.78	0.138	1.791	1.923	14.13	0.116	1.510	1.623	13.31
4220.509	0.152	1.972	2.105	14.94	0.145	1.879	2.011	14.78	0.126	1.633	1.756	14.40
4232.887	0.150	1.937	2.070	14.70	0.142	1.834	1.966	14.45	0.121	1.555	1.678	13.76
4257.815	0.153	1.953	2.086	14.81	0.146	1.866	1.998	14.69	0.126	1.604	1.727	14.16
4258.477	0.152	1.941	2.074	14.72	0.145	1.851	1.983	14.58	0.119	1.517	1.640	13.44
4265.418	0.148	1.885	2.018	14.33	0.141	1.793	1.925	14.15	0.122	1.553	1.676	13.74
4266.081	0.148	1.885	2.018	14.33	0.141	1.792	1.924	14.14	0.122	1.553	1.676	13.74
4268.915	0.153	1.947	2.080	14.77	0.149	1.893	2.025	14.88	0.123	1.563	1.686	13.82
4276.836	0.146	1.852	1.985	14.09	0.142	1.799	1.932	14.20	0.119	1.510	1.633	13.39
4284.838	0.148	1.872	2.005	14.23	0.145	1.833	1.965	14.44	0.118	1.490	1.613	13.22
4287.566	0.151	1.906	2.039	14.48	0.147	1.856	1.988	14.61	0.117	1.478	1.601	13.12
4288.310	0.151	1.906	2.039	14.48	0.142	1.790	1.922	14.13	0.124	1.564	1.687	13.83
4290.377	0.151	1.905	2.038	14.47	0.141	1.780	1.912	14.05	0.118	1.488	1.611	13.21
4290.542	0.159	2.005	2.138	15.18	0.148	1.865	1.997	14.68	0.120	1.509	1.632	13.38
4291.630	0.161	2.029	2.162	15.35	0.142	1.790	1.922	14.13	0.121	1.522	1.645	13.49
4294.936	0.156	1.963	2.096	14.88	0.147	1.850	1.982	14.57	0.120	1.507	1.630	13.36

λ	$\phi = 45\overset{\circ}{.}0$				$\phi = 60\overset{\circ}{.}0$				$\phi = 74\overset{\circ}{.}9$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
4196.699	0.084	1.092	1.197	12.02	0.056	0.739	0.819	11.63	0.032	0.432	0.482	13.14
4197.257	0.088	1.153	1.258	12.63	0.059	0.772	0.852	12.10	0.029	0.394	0.444	12.10
4203.730	0.082	1.069	1.174	11.79	0.060	0.782	0.862	12.24	0.034	0.457	0.507	13.82
4209.144	0.095	1.238	1.338	13.43	0.060	0.778	0.858	12.18	0.030	0.404	0.454	12.37
4216.136	0.086	1.118	1.223	12.28	0.061	0.794	0.874	12.41	0.032	0.430	0.480	13.08
4220.509	0.092	1.190	1.295	13.00	0.058	0.752	0.834	11.84	0.029	0.392	0.442	12.05
4232.887	0.094	1.216	1.321	13.26	0.056	0.706	0.786	11.16	0.028	0.375	0.425	11.58
4257.815	0.092	1.176	1.281	12.86	0.059	0.749	0.829	11.77	0.026	0.343	0.393	10.71
4258.477	0.092	1.174	1.279	12.84	0.060	0.768	0.848	12.04	0.034	0.449	0.499	13.60
4265.418	0.093	1.185	1.290	12.95	0.061	0.778	0.858	12.18	0.034	0.448	0.498	13.57
4266.081	0.096	1.220	1.325	13.30	0.058	0.737	0.817	11.60	0.035	0.462	0.512	13.95
4268.915	0.092	1.169	1.274	12.79	0.060	0.758	0.838	11.90	0.028	0.369	0.419	11.42
4276.836	0.096	1.218	1.323	13.28	0.058	0.736	0.816	11.59	0.028	0.369	0.419	11.42
4284.838	0.096	1.216	1.321	13.26	0.058	0.734	0.814	11.56	0.032	0.427	0.477	13.00
4287.566	0.088	1.114	1.219	12.24	0.056	0.705	0.783	11.15	0.031	0.408	0.458	12.48
4288.310	0.084	1.062	1.167	11.72	0.060	0.751	0.831	11.80	0.030	0.393	0.443	12.07
4290.377	0.093	1.174	1.279	12.84	0.046	0.685	0.765	10.86	0.031	0.408	0.458	12.48
4290.542	0.096	1.211	1.316	13.21	0.048	0.730	0.810	11.50	0.037	0.483	0.533	14.53
4291.630	0.091	1.148	1.253	12.58	0.059	0.743	0.823	11.69	0.033	0.433	0.483	13.16
4294.936	0.093	1.173	1.278	12.83	0.058	0.733	0.813	11.54	0.036	0.470	0.520	14.17

TABLE 4. — RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907 — Continued.

Plate ω 30. 1906, Oct. 19, 11^h 10^m G. M. T. Measured by A. on G. Distance from Limb 3.6 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	205.6	14.9	15.8	74.2	20.4	1.067
⊙−☊	131.2	29.9	30.3	59.7	10.8	1.018
P	−26.2	44.9	45.2	44.8	7.7	1.009
D	5.4	59.9	60.0	30.0	6.3	1.006
Diameter	171.9 mm	74.9	75.0	15.0	5.6	1.005
Factor	1.044	89.9	89.9	0.1	5.4	1.005

λ	$\phi = 0°.1$				$\phi = 15°.0$				$\phi = 30°.0$			
	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.148	1.967	2.106	14.95	0.136	1.808	1.947	14.31	0.114	1.516	1.642	13.46
4197.257	0.148	1.966	2.105	14.94	0.136	1.807	1.946	14.30	0.112	1.489	1.615	13.24
4203.730	0.148	1.962	2.101	14.92	0.138	1.830	1.969	14.47	0.116	1.540	1.666	13.66
4209.144	0.148	1.958	2.097	14.89	0.136	1.799	1.938	14.24	0.116	1.537	1.663	13.63
4216.136	0.146	1.926	2.065	14.66	0.135	1.781	1.920	14.11	0.113	1.492	1.618	13.26
4220.509	0.148	1.949	2.088	14.82	0.138	1.817	1.956	14.38	0.118	1.555	1.681	13.78
4232.887	0.150	1.966	2.105	14.94	0.137	1.796	1.935	14.22	0.118	1.548	1.674	13.72
4257.815	0.150	1.946	2.085	14.80	0.139	1.803	1.942	14.27	0.120	1.558	1.684	13.80
4258.477	0.149	1.933	2.072	14.71	0.138	1.790	1.929	14.18	0.119	1.545	1.661	13.62
4265.418	0.150	1.941	2.080	14.77	0.138	1.786	1.925	14.15	0.118	1.528	1.654	13.56
4266.081	0.150	1.941	2.080	14.77	0.138	1.786	1.925	14.15	0.118	1.528	1.654	13.56
4268.915	0.152	1.964	2.103	14.93	0.140	1.809	1.948	14.32	0.118	1.526	1.652	13.54
4276.836	0.148	1.905	2.044	14.51	0.138	1.777	1.916	14.08	0.116	1.496	1.622	13.30
4284.838	0.150	1.925	2.064	14.65	0.139	1.785	1.924	14.14	0.118	1.516	1.642	13.46
4287.566	0.152	1.949	2.088	14.82	0.139	1.782	1.921	14.12	0.117	1.502	1.628	13.35
4288.310	0.150	1.923	2.062	14.64	0.138	1.769	1.908	14.02	0.118	1.514	1.640	13.44
4290.377	0.148	1.896	2.035	14.45	0.140	1.793	1.932	14.20	0.116	1.487	1.613	13.22
4290.542	0.148	1.896	2.035	14.45	0.139	1.780	1.919	14.10	0.118	1.513	1.639	13.44
4291.630	0.149	1.907	2.046	14.52	0.140	1.793	1.932	14.20	0.118	1.512	1.638	13.43
4294.936	0.148	1.892	2.031	14.42	0.144	1.841	1.980	14.55	0.118	1.510	1.636	13.41

λ	$\phi = 44°.8$				$\phi = 59°.7$				$\phi = 74°.2$			
	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ
4196.699	0.090	1.201	1.308	13.08	0.057	0.767	0.847	11.92	0.022	0.311	0.358	9.33
4197.257	0.090	1.201	1.308	13.08	0.054	0.713	0.793	11.16	0.026	0.372	0.419	10.93
4203.730	0.093	1.238	1.345	13.45	0.056	0.752	0.832	11.71	0.028	0.400	0.447	11.66
4209.144	0.092	1.222	1.329	13.29	0.058	0.777	0.857	12.06	0.023	0.321	0.368	9.60
4216.136	0.089	1.179	1.286	12.86	0.056	0.750	0.830	11.68	0.024	0.342	0.389	10.14
4220.509	0.092	1.217	1.324	13.24	0.058	0.774	0.854	12.02	0.026	0.357	0.404	11.32
4232.887	0.091	1.198	1.305	13.05	0.058	0.770	0.850	11.97	0.026	0.364	0.411	10.72
4257.815	0.090	1.173	1.280	12.80	0.060	0.789	0.869	12.23	0.028	0.391	0.438	11.42
4258.477	0.092	1.199	1.306	13.06	0.059	0.776	0.856	12.05	0.028	0.385	0.432	11.26
4265.418	0.094	1.221	1.328	13.28	0.060	0.787	0.867	12.20	0.028	0.387	0.434	11.32
4266.081	0.096	1.247	1.354	13.54	0.060	0.787	0.867	12.20	0.028	0.389	0.436	11.37
4268.915	0.096	1.245	1.352	13.52	0.059	0.773	0.853	12.01	0.026	0.354	0.401	10.46
4276.836	0.093	1.203	1.310	13.10	0.058	0.756	0.836	11.77	0.027	0.374	0.421	10.98
4284.838	0.096	1.238	1.345	13.45	0.058	0.754	0.834	11.74	0.026	0.348	0.395	10.30
4287.566	0.095	1.223	1.330	13.30	0.058	0.753	0.833	11.73	0.030	0.403	0.450	11.73
4288.310	0.094	1.211	1.318	13.18	0.059	0.766	0.846	11.91	0.026	0.348	0.395	10.30
4290.377	0.096	1.235	1.342	13.42	0.058	0.752	0.832	11.71	0.027	0.362	0.409	10.66
4290.542	0.097	1.247	1.354	13.54	0.058	0.752	0.832	11.71	0.030	0.413	0.460	11.99
4291.630	0.096	1.235	1.342	13.42	0.058	0.752	0.832	11.71	0.028	0.386	0.433	11.29
4294.936	0.097	1.245	1.352	13.52	0.060	0.777	0.857	12.06	0.027	0.364	0.411	10.72

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 31. 1906, Oct. 19, 12^h 10^m G. M. T. Measured by A. on G. Distance from Limb 3.6 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
☉	205.7	14.9	15.8	74.2	20.4	1.067
☉−☊	131.3	29.9	30.3	59.7	10.8	1.018
P	−26.2	44.9	45.2	44.8	7.7	1.009
D	5.4	59.9	60.0	30.0	6.3	1.006
Diameter	171.9 mm	74.9	75.0	15.0	5.6	1.005
Factor	1.044	89.9	89.9	0.1	5.4	1.005

λ	ϕ = 0°.1				ϕ = 15°.0				ϕ = 30°.0			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.148	1.967	2.106	14.95	0.138	1.834	1.972	14.49	0.116	1.544	1.670	13.69
4197.257	0.147	1.954	2.093	14.86	0.138	1.834	1.972	14.49	0.118	1.569	1.695	13.90
4203.730	0.149	1.976	2.115	15.02	0.140	1.856	1.994	14.66	0.119	1.580	1.706	13.98
4209.144	0.150	1.985	2.124	15.08	0.140	1.852	1.990	14.63	0.120	1.589	1.715	14.06
4216.136	0.147	1.940	2.079	14.76	0.138	1.820	1.958	14.39	0.118	1.559	1.685	13.81
4220.509	0.150	1.976	2.115	15.02	0.140	1.844	1.982	14.57	0.118	1.556	1.682	13.79
4232.887	0.149	1.954	2.093	14.86	0.140	1.835	1.973	14.50	0.120	1.574	1.700	13.94
4257.815	0.150	1.946	2.085	14.80	0.143	1.855	1.993	14.65	0.120	1.559	1.685	13.81
4258.477	0.150	1.946	2.085	14.80	0.140	1.816	1.954	14.36	0.120	1.559	1.685	13.81
4265.418	0.150	1.941	2.080	14.77	0.142	1.837	1.975	14.52	0.120	1.555	1.681	13.78
4266.081	0.150	1.941	2.080	14.77	0.141	1.824	1.962	14.42	0.121	1.567	1.693	13.88
4268.915	0.150	1.938	2.077	14.74	0.141	1.821	1.959	14.40	0.120	1.552	1.678	13.76
4276.836	0.151	1.945	2.084	14.80	0.141	1.816	1.954	14.36	0.120	1.547	1.673	13.71
4284.838	0.151	1.938	2.077	14.74	0.142	1.822	1.960	14.41	0.118	1.516	1.642	13.46
4287.566	0.150	1.924	2.063	14.65	0.140	1.796	1.934	14.21	0.118	1.515	1.641	13.45
4288.310	0.148	1.898	2.037	14.46	0.142	1.820	1.958	14.39	0.120	1.540	1.666	13.66
4290.377	0.148	1.896	2.035	14.45	0.140	1.793	1.931	14.19	0.119	1.526	1.652	13.54
4290.542	0.149	1.908	2.047	14.53	0.141	1.807	1.945	14.30	0.122	1.565	1.691	13.86
4291.630	0.150	1.921	2.060	14.62	0.140	1.793	1.931	14.19	0.120	1.539	1.665	13.65
4294.936	0.150	1.918	2.057	14.60	0.140	1.790	1.928	14.17	0.120	1.536	1.662	13.62
	ϕ = 44°.8				ϕ = 59°.7				ϕ = 74°.2			
4196.699	0.090	1.201	1.308	13.08	0.058	0.781	0.861	12.12	0.027	0.381	0.428	11.16
4197.257	0.088	1.173	1.280	12.80	0.060	0.808	0.888	12.50	0.030	0.423	0.470	12.25
4203.730	0.090	1.198	1.305	13.05	0.060	0.806	0.886	12.47	0.030	0.422	0.469	12.23
4209.144	0.089	1.182	1.289	12.89	0.060	0.806	0.886	12.47	0.034	0.477	0.524	13.66
4216.136	0.089	1.179	1.286	12.86	0.059	0.789	0.869	12.23	0.028	0.392	0.439	11.45
4220.509	0.090	1.190	1.297	12.97	0.058	0.774	0.854	12.02	0.031	0.433	0.480	12.52
4232.887	0.088	1.159	1.266	12.66	0.061	0.810	0.890	12.52	0.028	0.390	0.437	11.39
4257.815	0.091	1.185	1.292	12.92	0.061	0.802	0.882	12.41	0.033	0.454	0.501	13.06
4258.477	0.090	1.172	1.279	12.79	0.062	0.815	0.895	12.59	0.030	0.413	0.460	11.99
4265.418	0.088	1.143	1.250	12.50	0.060	0.787	0.867	12.20	0.028	0.384	0.431	11.24
4266.081	0.090	1.169	1.276	12.76	0.059	0.773	0.853	12.00	0.030	0.412	0.459	11.97
4268.915	0.091	1.181	1.288	12.88	0.060	0.786	0.866	12.19	0.030	0.411	0.458	11.94
4276.836	0.090	1.164	1.271	12.71	0.060	0.784	0.864	12.16	0.026	0.356	0.403	10.51
4284.838	0.089	1.147	1.254	12.54	0.060	0.781	0.861	12.12	0.030	0.409	0.456	11.89
4287.566	0.090	1.159	1.266	12.66	0.060	0.781	0.861	12.12	0.027	0.367	0.414	10.79
4288.310	0.090	1.159	1.266	12.66	0.060	0.780	0.860	12.10	0.030	0.409	0.456	11.89
4290.377	0.088	1.131	1.238	12.38	0.060	0.780	0.860	12.10	0.028	0.381	0.428	11.16
4290.542	0.089	1.145	1.252	12.52	0.059	0.765	0.845	11.89	0.030	0.408	0.455	11.86
4291.630	0.089	1.144	1.251	12.51	0.059	0.765	0.845	11.89	0.028	0.381	0.428	11.16
4294.936	0.090	1.155	1.262	12.62	0.060	0.778	0.858	12.07	0.027	0.366	0.413	10.77

The results for Plate ω 35 are given on page 34.

TABLE 4. — RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907 — Continued.

Plate ω 36. 1906, Nov. 11, $10^h\ 15^m$ G. M. T. Measured by A. on G. Distance from Limb 2.2 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	228.6	15.5	15.8	74.2	12.6	1.021
⊙ − ☊	154.2	30.5	30.7	59.3	6.2	1.006
P	− 22.6	45.5	45.4	44.6	4.6	1.003
D	3.1	60.5	60.6	29.4	3.6	1.002
Diameter	171.6 mm	75.5	75.5	14.5	3.2	1.002
Factor	1.027	90.5	90.5	−0.5	3.1	1.002

λ	$\phi = -0°.5$				$\phi = 14°.5$				$\phi = 29°.4$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.148	1.929	2.070	14.70	0.143	1.865	2.005	14.70	0.119	1.552	1.682	13.69
4197.257	0.150	1.955	2.096	14.88	0.143	1.864	2.004	14.69	0.119	1.551	1.681	13.69
4203.730	0.151	1.963	2.104	14.94	0.141	1.834	1.974	14.47	0.120	1.560	1.690	13.76
4209.144	0.152	1.973	2.114	15.01	0.145	1.881	2.021	14.81	0.122	1.583	1.713	13.95
4216.136	0.151	1.954	2.095	14.87	0.144	1.864	2.004	14.69	0.120	1.553	1.683	13.70
4220.509	0.151	1.951	2.092	14.85	0.145	1.873	2.013	14.75	0.121	1.563	1.693	13.78
4232.887	0.151	1.942	2.083	14.79	0.145	1.865	2.005	14.70	0.122	1.568	1.698	13.82
4257.815	0.151	1.921	2.062	14.64	0.145	1.845	1.985	14.55	0.123	1.565	1.695	13.80
4258.477	0.153	1.947	2.088	14.82	0.145	1.845	1.985	14.55	0.121	1.539	1.669	13.59
4265.418	0.152	1.928	2.069	14.69	0.144	1.828	1.968	14.42	0.122	1.548	1.678	13.66
4266.081	0.152	1.928	2.069	14.69	0.145	1.840	1.980	14.51	0.120	1.523	1.653	13.46
4268.915	0.152	1.926	2.067	14.67	0.144	1.825	1.965	14.40	0.121	1.533	1.663	13.54
4276.836	0.151	1.908	2.049	14.55	0.146	1.844	1.984	14.54	0.121	1.528	1.658	13.50
4284.838	0.152	1.914	2.055	14.59	0.145	1.826	1.966	14.41	0.120	1.511	1.641	13.36
4287.566	0.151	1.900	2.041	14.49	0.143	1.799	1.939	14.21	0.121	1.522	1.652	13.45
4288.310	0.151	1.899	2.040	14.48	0.144	1.811	1.951	14.30	0.121	1.522	1.652	13.45
4290.377	0.152	1.910	2.051	14.56	0.145	1.821	1.961	14.37	0.120	1.508	1.638	13.34
4290.542	0.151	1.898	2.039	14.48	0.145	1.821	1.961	14.37	0.121	1.520	1.650	13.43
4291.630	0.150	1.884	2.025	14.38	0.145	1.821	1.961	14.37	0.122	1.532	1.662	13.53
4294.936	0.150	1.881	2.022	14.36	0.145	1.819	1.959	14.36	0.122	1.529	1.659	13.51
	$\phi = 44°.6$				$\phi = 59°.3$				$\phi = 74°.2$			
4196.699	0.089	1.162	1.273	12.69	0.057	0.746	0.831	11.56	0.028	0.372	0.425	11.08
4197.257	0.089	1.161	1.272	12.68	0.058	0.758	0.843	11.72	0.030	0.398	0.451	11.76
4203.730	0.090	1.171	1.282	12.78	0.058	0.757	0.842	11.71	0.030	0.380	0.433	11.29
4209.144	0.089	1.155	1.266	12.62	0.060	0.782	0.867	12.06	0.030	0.396	0.449	11.71
4216.136	0.089	1.152	1.263	12.59	0.057	0.741	0.826	11.49	0.029	0.382	0.435	11.34
4220.509	0.089	1.150	1.261	12.57	0.060	0.778	0.863	12.00	0.030	0.395	0.448	11.68
4232.887	0.089	1.145	1.256	12.52	0.059	0.761	0.846	11.76	0.031	0.406	0.459	11.97
4257.815	0.090	1.146	1.257	12.53	0.062	0.792	0.877	12.20	0.032	0.415	0.468	12.17
4258.477	0.090	1.146	1.257	12.53	0.061	0.779	0.864	12.01	0.031	0.401	0.454	11.84
4265.418	0.089	1.130	1.241	12.37	0.060	0.764	0.869	12.08	0.033	0.427	0.480	12.52
4266.081	0.090	1.143	1.254	12.50	0.060	0.764	0.849	11.81	0.032	0.413	0.466	12.15
4268.915	0.089	1.129	1.240	12.36	0.059	0.750	0.835	11.61	0.032	0.413	0.466	12.15
4276.836	0.091	1.151	1.262	12.58	0.062	0.786	0.871	12.11	0.029	0.373	0.426	11.11
4284.838	0.090	1.134	1.245	12.41	0.060	0.758	0.833	11.58	0.031	0.397	0.450	11.73
4287.566	0.090	1.133	1.244	12.40	0.061	0.770	0.855	11.89	0.029	0.371	0.424	11.06
4288.310	0.089	1.121	1.232	12.28	0.061	0.769	0.854	11.88	0.032	0.410	0.463	12.07
4290.377	0.090	1.132	1.243	12.39	0.059	0.744	0.829	11.53	0.031	0.396	0.449	11.71
4290.542	0.090	1.132	1.243	12.39	0.060	0.757	0.842	11.71	0.030	0.383	0.436	11.37
4291.630	0.088	1.106	1.217	12.13	0.062	0.782	0.867	12.06	0.032	0.409	0.462	12.05
4294.936	0.091	1.142	1.253	12.49	0.060	0.755	0.840	11.68	0.033	0.422	0.475	12.39

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 37. 1906, Nov. 11, $10^h\ 40^m$ G. M. T. Measured by A. on G. Distance from Limb 2.2 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	228.6	15.7	16.0	74.0	11.5	1.021
⊙−☊	154.2	30.7	30.8	59.2	6.2	1.006
P	−22.6	45.7	45.8	44.2	4.4	1.003
D	3.1	60.7	60.7	29.3	3.6	1.002
Diameter	171.6 mm	75.7	75.7	14.3	3.2	1.002
Factor	1.027	90.7	90.7	−0.7	3.1	1.002

λ	$\phi = -0.°7$				$\phi = 14.°3$				$\phi = 29.°3$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.150	1.960	2.101	14.92	0.143	1.867	2.007	14.71	0.120	1.569	1.699	13.84
4197.257	0.149	1.942	2.083	14.79	0.142	1.850	1.990	14.59	0.121	1.574	1.704	13.88
4203.730	0.149	1.943	2.084	14.80	0.142	1.849	1.929	14.58	0.122	1.581	1.711	13.94
4209.144	0.152	1.968	2.119	15.04	0.142	1.843	1.973	14.46	0.122	1.578	1.708	13.92
4216.136	0.150	1.936	2.077	14.75	0.142	1.833	1.973	14.46	0.122	1.584	1.714	13.97
4220.509	0.151	1.953	2.094	14.87	0.142	1.835	1.975	14.48	0.122	1.571	1.701	13.86
4232.887	0.154	1.980	2.121	15.06	0.143	1.839	1.979	14.51	0.122	1.571	1.701	13.86
4257.815	0.152	1.934	2.075	14.73	0.143	1.814	1.954	14.32	0.122	1.552	1.682	13.71
4258.477	0.152	1.930	2.071	14.70	0.143	1.817	1.957	14.34	0.122	1.557	1.687	13.75
4265.418	0.150	1.908	2.049	14.55	0.143	1.812	1.952	14.31	0.122	1.548	1.678	13.67
4266.081	0.153	1.937	2.078	14.75	0.143	1.812	1.952	14.31	0.122	1.548	1.678	13.67
4268.915	0.153	1.942	2.083	14.79	0.143	1.815	1.955	14.33	0.122	1.546	1.676	13.66
4276.836	0.152	1.926	2.067	14.67	0.143	1.806	1.946	14.26	0.123	1.554	1.684	13.72
4284.838	0.152	1.909	2.050	14.55	0.144	1.810	1.950	14.29	0.123	1.556	1.686	13.74
4287.566	0.153	1.930	2.071	14.70	0.143	1.799	1.939	14.21	0.123	1.543	1.673	13.63
4288.310	0.152	1.916	2.057	14.60	0.143	1.798	1.938	14.20	0.123	1.545	1.675	13.65
4290.377	0.151	1.903	2.044	14.51	0.143	1.799	1.939	14.21	0.123	1.543	1.673	13.63
4290.542	0.152	1.915	2.056	14.60	0.143	1.795	1.935	14.18	0.123	1.546	1.676	13.66
4291.630	0.151	1.897	2.038	14.47	0.142	1.778	1.918	14.06	0.123	1.548	1.678	13.67
4294.936	0.152	1.901	2.042	14.50	0.142	1.780	1.920	14.07	0.122	1.534	1.664	13.56

λ	$\phi = 44.°2$				$\phi = 59.°2$				$\phi = 74.°0$			
4196.699	0.090	1.174	1.285	12.72	0.062	0.806	0.891	12.35	0.030	0.404	0.457	11.77
4197.257	0.089	1.166	1.277	12.65	0.061	0.796	0.881	12.21	0.030	0.393	0.446	11.49
4203.730	0.089	1.166	1.277	12.65	0.062	0.814	0.899	12.46	0.031	0.411	0.464	11.95
4209.144	0.091	1.179	1.290	12.77	0.062	0.803	0.888	12.31	0.032	0.426	0.479	12.34
4216.136	0.090	1.171	1.282	12.70	0.061	0.793	0.878	12.17	0.031	0.414	0.467	12.03
4220.509	0.091	1.174	1.285	12.73	0.062	0.804	0.889	12.32	0.030	0.395	0.448	11.54
4232.887	0.092	1.190	1.301	12.89	0.062	0.806	0.891	12.35	0.032	0.420	0.473	12.18
4257.815	0.092	1.169	1.280	12.68	0.063	0.805	0.890	12.34	0.032	0.421	0.474	12.21
4258.477	0.088	1.126	1.237	12.25	0.064	0.822	0.907	12.57	0.032	0.415	0.468	12.05
4265.418	0.091	1.158	1.269	12.57	0.062	0.795	0.880	12.20	0.033	0.422	0.475	12.23
4266.081	0.090	1.148	1.259	12.47	0.061	0.775	0.860	11.92	0.031	0.404	0.457	11.77
4268.915	0.091	1.157	1.268	12.56	0.061	0.776	0.861	11.93	0.032	0.409	0.462	11.90
4276.836	0.090	1.133	1.244	12.32	0.062	0.781	0.866	12.00	0.030	0.391	0.444	11.44
4284.838	0.093	1.174	1.285	12.72	0.062	0.779	0.864	11.97	0.032	0.406	0.459	11.82
4287.566	0.090	1.128	1.239	12.27	0.062	0.786	0.871	12.07	0.032	0.415	0.468	12.05
4288.310	0.090	1.138	1.249	12.37	0.062	0.786	0.871	12.07	0.031	0.394	0.447	11.51
4290.377	0.089	1.117	1.228	12.16	0.062	0.777	0.862	11.95	0.032	0.405	0.458	11.80
4290.542	0.090	1.137	1.248	12.36	0.063	0.789	0.874	12.11	0.031	0.400	0.453	11.67
4291.630	0.091	1.149	1.260	12.48	0.062	0.782	0.867	12.02	0.032	0.405	0.458	11.80
4294.936	0.091	1.144	1.255	12.43	0.062	0.780	0.865	11.99	0.032	0.411	0.464	11.95

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 38. 1906, Nov. 11, $11^h\ 0^m$ G. M. T. Measured by L. on T. Distance from Limb 2.2 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	228.6	15.7	16.0	74.0	11.5	1.021
⊙−☊	154.2	30.7	30.8	59.2	6.2	1.006
P	−22.6	45.7	45.8	44.2	4.4	1.003
D	3.1	60.7	60.7	29.3	3.6	1.002
Diameter	171.6 mm	75.7	75.7	14.3	3.2	1.002
Factor	1.027	90.7	90.7	−0.7	3.1	1.002

λ	$\phi = -0°.7$				$\phi = 14°.3$				$\phi = 29°.3$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.148	1.926	2.067	14.68	0.138	1.798	1.938	14.20	0.116	1.511	1.641	13.36
4197.257	0.148	1.926	2.067	14.68	0.142	1.848	1.988	14.56	0.118	1.536	1.666	13.56
4203.730	0.152	1.974	2.115	15.02	0.145	1.883	2.023	14.82	0.122	1.586	1.716	13.97
4209.144	0.151	1.957	2.098	14.90	0.142	1.840	1.980	14.50	0.124	1.558	1.688	13.74
4216.136	0.148	1.914	2.055	14.59	0.137	1.771	1.911	14.00	0.118	1.526	1.656	13.48
4220.509	0.153	1.974	2.115	15.02	0.145	1.868	2.008	14.71	0.124	1.601	1.731	14.09
4232.887	0.150	1.928	2.069	14.69	0.140	1.801	1.941	14.22	0.120	1.542	1.672	13.61
4257.815	0.156	1.986	2.127	15.10	0.146	1.822	1.962	14.37	0.126	1.608	1.738	14.15
4258.477	0.148	1.884	2.025	14.38	0.142	1.804	1.944	14.24	0.121	1.540	1.670	13.60
4265.418	0.152	1.928	2.069	14.69	0.144	1.826	1.966	14.40	0.122	1.548	1.678	13.66
4266.081	0.156	1.978	2.119	15.04	0.148	1.874	2.014	14.76	0.124	1.568	1.698	13.82
4268.915	0.150	1.901	2.042	14.50	0.142	1.797	1.937	14.19	0.119	1.508	1.638	13.33
4276.836	0.156	1.970	2.111	14.99	0.143	1.807	1.947	14.26	0.121	1.529	1.659	13.51
4284.838	0.153	1.930	2.071	14.70	0.142	1.790	1.930	14.40	0.120	1.513	1.643	13.38
4287.566	0.155	1.950	2.091	14.85	0.145	1.828	1.968	14.42	0.122	1.537	1.667	13.57
4288.310	0.154	1.940	2.081	14.78	0.147	1.848	1.988	14.56	0.124	1.561	1.691	13.77
4290.377	0.156	1.963	2.104	14.94	0.140	1.762	1.902	13.94	0.123	1.547	1.677	13.65
4290.542	0.151	1.899	2.040	14.48	0.144	1.812	1.952	14.30	0.120	1.511	1.641	13.36
4291.630	0.154	1.935	2.076	14.74	0.140	1.762	1.902	13.94	0.124	1.559	1.689	13.75
4294.936	0.155	1.947	2.088	14.82	0.146	1.832	1.972	14.45	0.123	1.544	1.674	13.63

λ	$\phi = 44°.2$				$\phi = 59°.2$				$\phi = 74°.0$			
4196.699	0.088	1.149	1.260	12.48	0.059	0.772	0.857	11.88	0.029	0.382	0.435	11.20
4197.257	0.091	1.185	1.296	12.83	0.060	0.782	0.867	12.02	0.030	0.393	0.446	11.49
4203.730	0.092	1.198	1.309	12.96	0.066	0.855	0.940	13.03	0.036	0.463	0.516	13.29
4209.144	0.094	1.221	1.332	13.19	0.062	0.805	0.890	12.34	0.034	0.445	0.498	12.83
4216.136	0.088	1.140	1.251	12.39	0.060	0.780	0.865	11.99	0.031	0.403	0.456	11.75
4220.509	0.093	1.192	1.303	12.90	0.062	0.804	0.889	12.34	0.036	0.461	0.514	13.24
4232.887	0.091	1.164	1.275	12.63	0.064	0.823	0.908	12.59	0.035	0.457	0.510	13.14
4257.815	0.093	1.178	1.289	12.77	0.066	0.844	0.929	12.88	0.035	0.454	0.507	13.06
4258.477	0.092	1.168	1.279	12.67	0.066	0.839	0.924	12.81	0.034	0.438	0.491	12.65
4265.418	0.093	1.176	1.287	12.74	0.063	0.798	0.883	12.24	0.033	0.428	0.481	12.39
4266.081	0.092	1.166	1.277	12.65	0.065	0.827	0.912	12.64	0.032	0.413	0.466	12.00
4268.915	0.091	1.154	1.265	12.53	0.062	0.787	0.872	12.08	0.036	0.463	0.516	13.29
4276.836	0.093	1.173	1.284	12.71	0.063	0.796	0.881	12.21	0.032	0.411	0.464	11.95
4284.838	0.092	1.161	1.272	12.60	0.063	0.794	0.879	12.18	0.034	0.436	0.489	12.60
4287.566	0.094	1.181	1.292	12.79	0.065	0.823	0.908	12.59	0.032	0.410	0.463	11.93
4288.310	0.094	1.181	1.292	12.79	0.065	0.819	0.904	12.53	0.038	0.483	0.536	13.82
4290.377	0.093	1.170	1.281	12.69	0.064	0.808	0.893	12.38	0.034	0.436	0.489	12.60
4290.542	0.093	1.170	1.281	12.69	0.063	0.794	0.879	12.18	0.031	0.395	0.448	11.54
4291.630	0.092	1.159	1.270	12.58	0.062	0.783	0.868	12.03	0.035	0.443	0.496	12.78
4294.936	0.093	1.168	1.279	12.67	0.070	0.880	0.965	13.38	0.033	0.420	0.473	12.18

TABLE 4.— RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907 — Continued.

Plate ω 39. 1906, Nov. 11, $11^h\ 15^m$ G. M. T. Measured by L. on T. Distance from Limb 2.2 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
☉	228.7	15.7	16.0	74.0	11.6	1.021
☉ − ☊	154.3	30.7	30.8	59.2	6.1	1.006
P	− 22.6	45.7	45.8	44.2	4.4	1.003
D	3.1	60.7	60.7	29.3	3.6	1.002
Diameter	171.6 mm	75.7	75.7	14.3	3.2	1.002
Factor	1.027	90.7	90.7	−0.7	3.1	1.002

λ	$\phi = -0°.7$				$\phi = 14°.3$				$\phi = 29°.3$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.150	1.950	2.091	14.85	0.135	1.758	1.898	13.91	0.118	1.536	1.666	13.56
4197.257	0.150	1.950	2.091	14.85	0.137	1.782	1.922	14.08	0.119	1.548	1.678	13.66
4203.730	0.152	1.977	2.118	15.04	0.141	1.828	1.968	14.42	0.120	1.560	1.690	13.76
4209.144	0.151	1.957	2.098	14.90	0.143	1.847	1.987	14.56	0.122	1.584	1.714	13.95
4216.136	0.147	1.903	2.044	14.51	0.142	1.837	1.977	14.48	0.118	1.526	1.656	13.48
4220.509	0.154	1.988	2.129	15.12	0.144	1.853	1.993	14.60	0.125	1.616	1.746	14.21
4232.887	0.153	1.964	2.105	14.94	0.143	1.837	1.977	14.48	0.122	1.567	1.697	13.82
4257.815	0.151	1.924	2.065	14.66	0.144	1.834	1.974	14.46	0.126	1.605	1.735	14.12
4258.477	0.153	1.947	2.088	14.82	0.142	1.818	1.958	14.34	0.122	1.554	1.684	13.71
4265.418	0.152	1.931	2.072	14.71	0.146	1.844	1.984	14.35	0.121	1.537	1.667	13.57
4266.081	0.156	1.978	2.119	15.04	0.144	1.819	1.959	14.35	0.126	1.598	1.728	14.07
4268.915	0.156	1.977	2.118	15.04	0.144	1.820	1.960	14.36	0.122	1.548	1.678	13.66
4276.836	0.152	1.919	2.060	14.63	0.143	1.799	1.939	14.21	0.123	1.555	1.685	13.72
4284.838	0.153	1.926	2.067	14.68	0.146	1.835	1.975	14.47	0.124	1.563	1.693	13.78
4287.566	0.156	1.964	2.105	14.94	0.145	1.825	1.965	14.40	0.123	1.549	1.679	13.69
4288.310	0.154	1.937	2.078	14.75	0.144	1.820	1.960	14.36	0.121	1.522	1.652	13.45
4290.377	0.153	1.923	2.064	14.65	0.144	1.819	1.959	14.35	0.121	1.521	1.651	13.44
4290.542	0.152	1.913	2.054	14.58	0.148	1.859	1.999	14.65	0.124	1.561	1.691	13.77
4291.630	0.155	1.947	2.088	14.82	0.144	1.818	1.958	14.35	0.121	1.521	1.651	13.44
4294.936	0.154	1.932	2.073	14.72	0.145	1.819	1.959	14.35	0.123	1.546	1.676	13.64
	$\phi = 44°.2$				$\phi = 59°.2$				$\phi = 74°.0$			
4196.699	0.088	1.170	1.281	12.68	0.059	0.772	0.857	11.88	0.030	0.398	0.451	11.52
4197.257	0.088	1.170	1.281	12.68	0.060	0.792	0.877	12.16	0.029	0.387	0.440	11.33
4203.730	0.092	1.195	1.306	12.93	0.063	0.821	0.906	12.56	0.034	0.448	0.501	12.90
4209.144	0.095	1.231	1.342	13.39	0.064	0.831	0.916	12.70	0.034	0.446	0.499	12.85
4216.136	0.089	1.153	1.264	12.51	0.061	0.790	0.875	12.13	0.030	0.400	0.453	11.67
4220.509	0.093	1.196	0.307	12.94	0.064	0.829	0.914	12.67	0.033	0.436	0.489	12.60
4232.887	0.092	1.178	1.289	12.76	0.063	0.812	0.897	12.43	0.036	0.470	0.523	13.47
4257.815	0.094	1.192	1.303	12.90	0.066	0.839	0.924	12.81	0.038	0.453	0.506	13.03
4258.477	0.093	1.182	1.293	12.80	0.064	0.818	0.903	12.52	0.033	0.427	0.480	12.36
4265.418	0.093	1.180	1.291	12.78	0.064	0.817	0.902	12.50	0.033	0.427	0.480	12.36
4266.081	0.093	1.180	1.291	12.78	0.066	0.838	0.923	12.80	0.035	0.452	0.505	13.01
4268.915	0.092	1.168	1.279	12.67	0.064	0.812	0.897	12.43	0.033	0.426	0.479	12.34
4276.836	0.094	1.187	1.298	12.85	0.063	0.798	0.883	12.24	0.036	0.461	0.514	13.24
4284.838	0.094	1.185	1.296	12.83	0.063	0.796	0.881	12.21	0.034	0.436	0.489	12.60
4287.566	0.093	1.174	1.285	12.72	0.065	0.820	0.905	12.54	0.036	0.460	0.513	13.21
4288.310	0.092	1.160	1.271	12.58	0.064	0.809	0.894	12.39	0.036	0.460	0.513	13.21
4290.377	0.091	1.144	1.255	12.43	0.064	0.809	0.894	12.39	0.032	0.410	0.463	11.93
4290.542	0.093	1.170	1.281	12.69	0.063	0.795	0.880	12.20	0.032	0.410	0.463	11.93
4291.630	0.094	1.183	1.294	12.81	0.066	0.829	0.914	12.67	0.035	0.446	0.499	12.85
4294.936	0.097	1.218	1.329	13.16	0.064	0.804	0.889	12.32	0.035	0.446	0.499	12.85

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 35. 1906, Nov. 11, $10^h\ 0^m$ G. M. T. Measured by L. on T. Distance from Limb 2.2 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η		
	°	°	°	°	°			°
☉	228.6	15.5	15.8	74.2	12.6	1.021	D	3.1
☉−☊	154.2	90.5	90.5	−0.5	3.1	1.002	Diameter	171.6 mm
P	−22.6						Factor	1.027

λ	$\phi = -0.°5$				$\phi = 74.°2$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°
4196.699	0.148	1.925	2.066	14.67	0.029	0.386	0.439	11.45
4197.257	0.150	1.950	2.091	14.85	0.030	0.397	0.450	11.73
4203.730	0.153	1.987	2.128	15.11	0.033	0.436	0.489	12.75
4209.144	0.154	1.995	2.136	15.16	0.035	0.462	0.515	13.43
4216.136	0.149	1.876	2.017	14.32	0.030	0.395	0.448	11.68
4220.509	0.153	1.974	2.115	15.02	0.032	0.420	0.473	12.33
4232.887	0.153	1.967	2.108	14.97	0.033	0.430	0.483	12.60
4257.815	0.155	1.973	2.114	15.01	0.034	0.437	0.490	12.78
4258.477	0.151	1.923	2.064	14.65	0.035	0.452	0.505	13.17
4265.418	0.152	1.927	2.068	14.68	0.034	0.436	0.489	12.75
4266.081	0.153	1.940	2.081	14.78	0.034	0.436	0.489	12.75
4268.915	0.152	1.925	2.066	14.67	0.034	0.436	0.489	12.75
4276.836	0.152	1.922	2.063	14.65	0.034	0.436	0.489	12.75
4284.838	0.154	1.943	2.084	14.79	0.033	0.425	0.478	12.46
4287.566	0.153	1.925	2.066	14.67	0.034	0.435	0.488	12.73
4288.310	0.154	1.938	2.079	14.76	0.034	0.435	0.488	12.73
4290.377	0.150	1.888	2.029	14.41	0.034	0.435	0.488	12.73
4290.542	0.153	1.923	2.064	14.65	0.035	0.445	0.498	12.99
4291.630	0.153	1.922	2.063	14.65	0.033	0.421	0.474	12.36
4294.936	0.154	1.931	2.072	14.71	0.033	0.420	0.473	12.33

Plate ω 39½. 1906, Dec. 18, $5^h\ 50^m$ G. M. T. Measured by L. on T. Distance from Limb 4.1 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η		
	°	°	°	°	°			°
☉	265.9	59.9	59.9	30.1	1.7	1.000	D	−1.5
☉−☊	191.5	74.9	74.9	15.1	1.5	1.000	Diameter	175.2 mm
P	−8.8	89.9	89.9	0.1	1.4	1.000	Factor	1.049

λ	$\phi = 0.°1$				$\phi = 15.°1$				$\phi = 30.°1$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.148	1.963	2.104	14.94	0.138	1.833	1.973	14.52	0.119	1.577	1.707	14.02
4197.257	0.148	1.963	2.104	14.94	0.138	1.833	1.973	14.52	0.120	1.587	1.717	14.10
4203.730	0.150	1.985	2.126	15.09	0.141	1.837	1.977	14.54	0.119	1.575	1.705	14.00
4209.144	0.153	2.021	2.162	15.35	0.142	1.871	2.011	14.79	0.122	1.594	1.724	14.16
4216.136	0.146	1.926	2.067	14.67	0.139	1.836	1.976	14.54	0.118	1.556	1.686	13.85
4220.509	0.151	1.974	2.115	15.02	0.141	1.855	1.995	14.68	0.122	1.586	1.716	14.09
4232.887	0.150	1.958	2.099	14.90	0.142	1.846	1.986	14.61	0.122	1.582	1.712	14.06
4257.815	0.150	1.947	2.088	14.82	0.144	1.868	2.008	14.77	0.124	1.597	1.727	14.19
4258.477	0.150	1.946	2.087	14.82	0.141	1.823	1.963	14.44	0.120	1.552	1.682	13.82
4265.418	0.152	1.965	2.106	14.95	0.142	1.831	1.971	14.50	0.123	1.584	1.714	14.08
4266.081	0.156	2.016	2.157	15.31	0.143	1.850	1.990	14.64	0.121	1.563	1.693	13.91
4268.915	0.149	1.924	2.065	14.66	0.140	1.805	1.945	14.31	0.122	1.566	1.696	13.93
4276.836	0.152	1.956	2.097	14.89	0.142	1.823	1.963	14.44	0.123	1.580	1.710	14.05
4284.838	0.153	1.963	2.104	14.94	0.145	1.860	2.000	14.71	0.121	1.556	1.686	13.85
4287.566	0.153	1.967	2.108	14.97	0.144	1.848	1.988	14.63	0.122	1.562	1.692	13.90
4288.310	0.154	1.972	2.113	15.00	0.141	1.808	1.948	14.33	0.124	1.587	1.717	14.10
4290.377	0.151	1.933	2.074	14.72	0.141	1.810	1.950	14.35	0.120	1.537	1.667	13.69
4290.542	0.150	1.922	2.063	14.65	0.145	1.858	1.998	14.70	0.125	1.599	1.729	14.20
4291.630	0.152	1.949	2.090	14.84	0.140	1.796	1.936	14.24	0.123	1.575	1.705	14.00
4294.936	0.153	1.959	2.100	14.91	0.142	1.815	1.955	14.38	0.122	1.560	1.690	13.88

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 40. 1906, Dec. 18, 6h 40m G. M. T. Measured by L. on T. Distance from Limb 4.1 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
☉	265.9	59.9	59.9	30.1	1.7	1.000
☉−☊	191.5	74.9	74.9	15.1	1.5	1.000
P	−8.8	89.9	89.9	0.1	1.4	1.000
D	−1.5					
Diameter	175.6 mm					
Factor	1.049					

λ	$\phi = 0°.1$				$\phi = 0°.1$				$\phi = 15°.1$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.148	1.964	2.105	14.94	0.150	1.990	2.131	15.13	0.138	1.833	1.973	14.50
4197.257	0.148	1.964	2.105	14.94	0.150	1.990	2.131	15.13	0.139	1.843	1.983	14.58
4203.730	0.152	2.013	2.154	15.29	0.149	1.975	2.116	15.02	0.141	1.863	2.003	14.72
4209.144	0.149	1.966	2.107	14.96	0.150	1.984	2.125	15.09	0.141	1.805	1.945	14.30
4216.136	0.151	1.986	2.127	15.10	0.148	1.951	2.092	14.85	0.141	1.858	1.998	14.68
4220.509	0.150	1.975	2.116	15.02	0.152	2.001	2.142	15.21	0.140	1.841	1.981	14.56
4232.887	0.149	1.954	2.095	14.87	0.150	1.966	2.107	14.96	0.141	0.846	1.986	14.60
4257.815	0.152	1.969	2.110	14.98	0.155	2.013	2.154	15.29	0.142	1.843	1.983	14.58
4258.477	0.152	1.968	2.109	14.97	0.149	1.936	2.077	14.74	0.139	1.802	1.942	14.27
4265.418	0.150	1.940	2.081	14.77	0.151	1.954	2.095	14.87	0.143	1.851	1.991	14.63
4266.081	0.153	1.976	2.117	15.03	0.152	1.960	2.101	14.92	0.143	1.850	1.990	14.63
4268.915	0.152	1.959	2.100	14.91	0.150	1.938	2.079	14.76	0.143	1.849	1.989	14.62
4276.836	0.153	1.971	2.112	14.99	0.151	1.945	2.086	14.81	0.144	1.853	1.993	14.65
4284.838	0.152	1.953	2.094	14.87	0.152	1.953	2.094	14.87	0.142	1.824	1.964	14.44
4287.566	0.148	1.900	2.041	14.49	0.152	1.951	2.092	14.85	0.140	1.797	1.937	14.24
4288.310	0.151	1.937	2.078	14.75	0.156	1.998	2.139	15.18	0.143	1.848	1.988	14.61
4290.377	0.152	1.947	2.088	14.82	0.151	1.936	2.077	14.74	0.140	1.796	1.936	14.23
4290.542	0.150	1.921	2.062	14.64	0.151	1.936	2.077	14.74	0.144	1.844	1.984	14.58
4291.630	0.150	1.921	2.062	14.64	0.152	1.946	2.087	14.81	0.141	1.806	1.946	14.30
4294.936	0.152	1.945	2.086	14.81	0.150	1.919	2.060	14.62	0.143	1.831	1.971	14.49
	$\phi = 15°.1$				$\phi = 30°.1$				$\phi = 30°.1$			
4196.699	0.139	1.843	1.983	14.58	0.120	1.592	1.722	14.13	0.119	1.581	1.711	14.04
4197.257	0.140	1.859	1.999	14.69	0.119	1.578	1.708	14.02	0.123	1.633	1.763	14.47
4203.730	0.141	1.867	2.007	14.75	0.123	1.631	1.761	14.45	0.122	1.616	1.746	14.33
4209.144	0.143	1.887	2.027	14.90	0.122	1.610	1.740	14.28	0.120	1.584	1.714	14.06
4216.136	0.140	1.843	1.983	14.58	0.117	1.541	1.671	13.71	0.118	1.556	1.686	13.84
4220.509	0.140	1.841	1.981	14.56	0.121	1.591	1.721	14.12	0.120	1.580	1.710	14.03
4232.887	0.143	1.872	2.012	14.79	0.120	1.561	1.691	13.88	0.122	1.597	1.727	14.17
4257.815	0.141	1.828	1.968	14.46	0.121	1.559	1.689	13.86	0.122	1.585	1.715	14.07
4258.477	0.140	1.813	1.953	14.35	0.124	1.607	1.737	14.25	0.122	1.581	1.711	14.04
4265.418	0.141	1.825	1.965	14.44	0.121	1.560	1.690	13.87	0.124	1.604	1.734	14.23
4266.081	0.140	1.810	1.950	14.33	0.124	1.604	1.734	14.23	0.123	1.589	1.719	14.11
4268.915	0.142	1.834	1.974	14.51	0.120	1.547	1.677	13.76	0.123	1.588	1.718	14.10
4276.836	0.145	1.871	2.011	14.78	0.122	1.570	1.700	13.95	0.122	1.566	1.696	13.92
4284.838	0.140	1.799	1.939	14.25	0.121	1.552	1.682	13.80	0.121	1.552	1.682	13.80
4287.566	0.144	1.848	1.988	14.61	0.121	1.551	1.681	13.79	0.122	1.563	1.693	13.89
4288.310	0.141	1.808	1.948	14.32	0.120	1.540	1.670	13.70	0.122	1.562	1.692	13.88
4290.377	0.140	1.796	1.936	14.23	0.119	1.525	1.655	13.58	0.120	1.540	1.670	13.70
4290.542	0.140	1.796	1.936	14.23	0.121	1.550	1.680	13.79	0.117	1.499	1.629	13.37
4291.630	0.147	1.884	2.024	14.88	0.121	1.550	1.680	13.79	0.121	1.550	1.680	13.79
4294.936	0.142	1.815	1.955	14.37	0.122	1.560	1.690	13.87	0.122	1.560	1.690	13.87

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 41. 1906, Dec. 18, 6^h 50^m G. M. T. Measured by L. on T. Distance from Limb 4.1 mm. Quality, good.

	°
⊙	265.9
⊙−☊	191.5
P	−8.8
D	−1.5
Diameter	175.6 mm
Factor	1.049

$p-P$	π	ϕ	η	sec η
°	°	°	°	
59.9	59.9	30.1	1.7	1.000
74.9	74.9	15.1	1.5	1.000
89.9	89.9	0.1	1.4	1.000

λ	$\phi = 0°.1$				$\phi = 0°.1$				$\phi = 15°.1$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.145	1.927	2.068	14.68	0.145	1.927	2.068	14.68	0.136	1.806	1.946	14.30
4197.257	0.146	1.938	2.079	14.76	0.144	1.913	2.054	14.58	0.138	1.832	1.972	14.49
4203.730	0.147	1.946	2.087	14.82	0.147	1.946	2.087	14.82	0.141	1.861	2.001	14.71
4209.144	0.148	1.958	2.099	14.90	0.148	1.954	2.095	14.87	0.140	1.794	1.934	14.21
4216.136	0.146	1.926	2.067	14.67	0.145	1.912	2.053	14.58	0.138	1.820	1.960	14.41
4220.509	0.148	1.949	2.090	14.84	0.148	1.945	2.086	14.81	0.141	1.856	1.990	14.63
4232.887	0.150	1.965	2.106	14.95	0.150	1.965	2.106	14.95	0.139	1.818	1.958	14.39
4257.815	0.153	1.985	2.126	15.09	0.150	1.946	2.087	14.82	0.141	1.828	1.968	14.46
4258.477	0.148	1.922	2.063	14.65	0.150	1.946	2.087	14.82	0.140	1.813	1.953	14.35
4265.418	0.152	1.969	2.110	14.98	0.152	1.968	2.109	14.97	0.142	1.836	1.976	14.52
4266.081	0.151	1.954	2.095	14.87	0.148	1.919	2.060	14.63	0.142	1.836	1.976	14.52
4268.915	0.151	1.952	2.093	14.86	0.149	1.928	2.069	14.69	0.142	1.835	1.975	14.52
4276.836	0.152	1.960	2.101	14.92	0.152	1.959	2.100	14.91	0.141	1.817	1.957	14.38
4284.838	0.150	1.928	2.069	14.69	0.150	1.928	2.069	14.69	0.142	1.807	1.947	14.31
4287.566	0.151	1.937	2.078	14.75	0.150	1.923	2.064	14.65	0.141	1.809	1.949	14.32
4288.310	0.152	1.951	2.092	14.85	0.151	1.933	2.074	14.72	0.140	1.794	1.934	14.21
4290.377	0.151	1.936	2.077	14.75	0.149	1.912	2.053	14.58	0.142	1.803	1.943	14.28
4290.542	0.151	1.936	2.077	14.75	0.150	1.922	2.063	14.65	0.140	1.792	1.932	14.20
4291.630	0.151	1.936	2.077	14.75	0.150	1.922	2.063	14.65	0.141	1.807	1.947	14.31
4294.936	0.151	1.934	2.075	14.74	0.152	1.945	2.086	14.81	0.140	1.791	1.931	14.19
	$\phi = 15°.1$				$\phi = 30°.1$				$\phi = 30°.1$			
4196.699	0.136	1.806	1.946	14.30	0.121	1.607	1.737	14.25	0.115	1.525	1.655	13.58
4197.257	0.136	1.806	1.946	14.30	0.121	1.607	1.737	14.25	0.117	1.551	1.681	13.79
4203.730	0.139	1.840	1.980	14.55	0.120	1.590	1.720	14.11	0.119	1.574	1.704	13.98
4209.144	0.140	1.848	1.988	14.61	0.118	1.558	1.688	13.85	0.119	1.572	1.702	13.97
4216.136	0.137	1.805	1.945	14.30	0.118	1.556	1.686	13.84	0.116	1.529	1.659	13.61
4220.509	0.138	1.814	1.954	14.36	0.118	1.554	1.684	13.82	0.120	1.578	1.708	14.02
4232.887	0.141	1.794	1.934	14.21	0.120	1.571	1.701	13.96	0.119	1.561	1.691	13.88
4257.815	0.142	1.843	1.983	14.58	0.122	1.585	1.715	14.07	0.120	1.554	1.684	13.82
4258.477	0.140	1.812	1.952	14.34	0.123	1.591	1.721	14.12	0.121	1.565	1.695	13.91
4265.418	0.140	1.809	1.949	14.32	0.121	1.567	1.697	13.93	0.120	1.552	1.682	13.80
4266.081	0.141	1.826	1.966	14.45	0.121	1.567	1.697	13.93	0.122	1.576	1.706	14.00
4268.915	0.141	1.824	1.964	14.44	0.123	1.588	1.718	14.10	0.120	1.551	1.681	13.79
4276.836	0.142	1.832	1.972	14.49	0.122	1.574	1.704	13.98	0.123	1.583	1.713	14.06
4284.838	0.143	1.839	1.979	14.55	0.122	1.567	1.697	13.93	0.119	1.530	1.660	13.62
4287.566	0.141	1.807	1.947	14.31	0.122	1.566	1.696	13.92	0.122	1.571	1.701	13.96
4288.310	0.141	1.807	1.947	14.31	0.124	1.591	1.721	14.12	0.121	1.562	1.692	13.88
4290.377	0.142	1.819	1.959	14.40	0.123	1.577	1.707	14.01	0.121	1.562	1.692	13.88
4290.542	0.142	1.819	1.959	14.40	0.122	1.566	1.696	13.92	0.123	1.575	1.705	13.99
4291.630	0.142	1.817	1.957	14.38	0.118	1.514	1.644	13.49	0.122	1.565	1.695	13.91
4294.936	0.143	1.831	1.971	14.49	0.122	1.560	1.690	13.87	0.122	1.564	1.694	13.90

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 46. 1906, Dec. 18, $10^h 30^m$ G. M. T. Measured by L. on T. Distance from Limb 4.1 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	266.1	30.6	30.6	59.4	2.9	1.001
⊙−☊	191.7	45.6	45.6	44.4	2.1	1.001
P	−8.8					
D	−1.5					
Diameter	175.0 mm					
Factor	1.047					

λ	$\phi = 44°.4$				$\phi = 44°.4$				$\phi = 44°.4$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.088	1.168	1.281	12.73	0.086	1.138	1.251	12.43	0.088	1.164	1.277	12.69
4197.257	0.088	1.168	1.281	12.73	0.088	1.163	1.276	12.68	0.089	1.178	1.291	12.83
4203.730	0.090	1.187	1.300	12.92	0.090	1.187	1.300	12.92	0.092	1.216	1.329	13.21
4209.144	0.090	1.186	1.299	12.91	0.090	1.186	1.299	12.91	0.092	1.211	1.324	13.16
4216.136	0.089	1.170	1.283	12.75	0.091	1.198	1.311	13.03	0.088	1.159	1.272	12.64
4220.509	0.091	1.193	1.306	12.98	0.091	1.197	1.310	13.02	0.092	1.208	1.321	13.13
4232.887	0.092	1.201	1.314	13.06	0.093	1.215	1.328	13.20	0.090	1.176	1.289	12.81
4257.815	0.093	1.205	1.318	13.10	0.093	1.204	1.317	13.09	0.092	1.189	1.302	12.94
4258.477	0.092	1.187	1.300	12.92	0.093	1.204	1.317	13.09	0.090	1.165	1.278	12.70
4265.418	0.095	1.226	1.339	13.31	0.094	1.209	1.322	13.14	0.093	1.199	1.312	13.04
4266.081	0.092	1.185	1.298	12.90	0.092	1.185	1.298	12.90	0-092	1.188	1.301	12.93
4268.915	0.092	1.182	1.295	12.87	0.092	1.184	1.297	12.89	0.093	1.198	1.311	13.02
4276.836	0.091	1.171	1.284	12.76	0.093	1.196	1.309	13.01	0.092	1.185	1.298	12.90
4284.838	0.092	1.180	1.293	12.84	0.092	1.180	1.293	12.85	0.090	1.159	1.272	12.64
4287.566	0.096	1.231	1.344	13.35	0.092	1.179	1.292	12.84	0.092	1.179	1.292	12.84
4288.310	0.090	1.154	1.267	12.59	0.092	1.179	1.292	12.84	0.091	1.168	1.281	12.73
4290.377	0.090	1.149	1.262	12.54	0.093	1.163	1.276	12.68	0.090	1.154	1.277	12.69
4290.542	0.089	1.139	1.252	12.44	0.091	1.149	1.262	12.54	0.092	1.178	1.291	12.83
4291.630	0.091	1.164	1.279	12.71	0.092	1.178	1.291	12.83	0.091	1.167	1.280	12.72
4294.936	0.092	1.177	1.290	12.82	0.094	1.198	1.311	13.03	0.092	1.177	1.290	12.82
	$\phi = 59°.4$				$\phi = 59°.4$				$\phi = 59°.4$			
4196.699	0.058	0.766	0.852	11.88	0.058	0.768	0.854	11.91	0.060	0.793	0.879	12.26
4197.257	0.056	0.736	0.822	11.46	0.061	0.804	0.890	12.41	0.057	0.757	0.843	11.76
4203.730	0.060	0.792	0.878	12.25	0.061	0.803	0.889	12.40	0.064	0.844	0.930	12.97
4209.144	0.062	0.816	0.902	12.58	0.062	0.816	0.902	12.58	0.062	0.816	0.902	12.58
4216.136	0.060	0.790	0.876	12.22	0.061	0.801	0.887	12.37	0.058	0.764	0.850	11.85
4220.509	0.062	0.814	0.900	12.55	0.062	0.814	0.900	12.55	0.061	0.803	0.889	12.40
4232.887	0.062	0.812	0.898	12.52	0.063	0.822	0.908	12.66	0.065	0.848	0.934	13.03
4257.815	0.064	0.828	0.914	12.74	0.064	0.825	0.911	12.71	0.062	0.802	0.888	12.38
4258.477	0.061	0.793	0.879	12.26	0.062	0.800	0.886	12.36	0.062	0.839	0.925	12.90
4265.418	0.065	0.847	0.933	13.01	0.061	0.788	0.874	12.19	0.064	0.829	0.915	12.76
4266.081	0.064	0.827	0.913	12.73	0.064	0.824	0.910	12.69	0.065	0.839	0.925	12.90
4268.915	0.063	0.812	0.892	12.44	0.065	0.838	0.924	12.89	0.063	0.809	0.875	12.20
4276.836	0.062	0.802	0.888	12.38	0.062	0.797	0.883	12.32	0.062	0.797	0.883	12.32
4284.838	0.061	0.788	0.874	12.19	0.065	0.831	0.917	12.79	0.063	0.806	0.892	12.44
4287.566	0.063	0.809	0.895	12.48	0.063	0.805	0.891	12.43	0.061	0.781	0.867	12.09
4288.310	0.062	0.795	0.881	12.29	0.064	0.820	0.906	12.64	0.062	0.795	0.881	12.29
4290.377	0.060	0.770	0.856	11.94	0.062	0.794	0.880	12.27	0.063	0.805	0.891	12.43
4290.542	0.061	0.784	0.870	12.13	0.062	0.794	0.880	12.27	0.063	0.805	0.891	12.43
4291.630	0.062	0.794	0.880	12.27	0.063	0.804	0.890	12.41	0.062	0.794	0.880	12.27
4294.936	0.062	0.794	0.880	12.27	0.061	0.780	0.866	12.08	0.063	0.804	0.890	12.41

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 47. 1906, Dec. 18, 10^h 50^m G. M. T. Measured by L. on T. Distance from Limb 3.9 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	266.1	30.6	30.6	59.4	2.9	1.001
⊙ − ☊	191.7	38.1	38.1	51.9	2.4	1.001
P	−8.8	45.6	45.6	44.4	2.1	1.001
D	−1.5	54.6	54.6	35.4	1.8	1.000
Diameter	175.0 mm					
Factor	1.047					

λ	$\phi = 35°.4$				$\phi = 35°.4$				$\phi = 44°.4$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.106	1.410	1.535	13.37	0.101	1.386	1.511	13.16	0.086	1.169	1.282	12.74
4197.257	0.107	1.417	1.542	13.43	0.103	1.366	1.491	12.99	0.088	1.169	1.282	12.74
4203.730	0.105	1.386	1.511	13.16	0.108	1.427	1.552	13.52	0.092	1.207	1.320	13.12
4209.144	0.108	1.426	1.551	13.51	0.106	1.398	1.523	13.26	0.091	1.197	1.310	13.02
4216.136	0.109	1.434	1.559	13.58	0.102	1.392	1.517	13.21	0.090	1.185	1.298	12.90
4220.509	0.108	1.418	1.543	13.44	0.106	1.391	1.516	13.20	0.092	1.209	1.322	13.14
4232.887	0.108	1.415	1.540	13.41	0.104	1.405	1.530	13.33	0.091	1.187	1.300	12.92
4257.815	0.108	1.400	1.525	13.28	0.108	1.397	1.522	13.26	0.092	1.205	1.315	13.07
4258.477	0.109	1.410	1.535	13.37	0.107	1.386	1.511	13.16	0.092	1.202	1.315	13.07
4265.418	0.109	1.408	1.533	13.35	0.108	1.394	1.519	13.23	0.095	1.224	1.337	13.29
4266.081	0.111	1.432	1.557	13.56	0.106	1.369	1.494	13.01	0.093	1.200	1.313	13.05
4268.915	0.112	1.445	1.570	13.67	0.108	1.393	1.518	13.22	0.093	1.199	1.312	13.04
4276.836	0.114	1.464	1.589	13.84	0.110	1.415	1.540	13.41	0.094	1.207	1.320	13.12
4284.838	0.110	1.410	1.535	13.37	0.111	1.426	1.551	13.51	0.094	1.204	1.317	13.09
4287.566	0.109	1.395	1.520	13.24	0.107	1.370	1.495	13.02	0.092	1.180	1.293	12.85
4288.310	0.108	1.385	1.510	13.15	0.108	1.384	1.509	13.14	0.096	1.229	1.342	13.34
4290.377	0.108	1.384	1.509	13.14	0.109	1.395	1.520	13.24	0.092	1.179	1.292	12.84
4290.542	0.108	1.384	1.509	13.14	0.108	1.384	1.509	13.14	0.092	1.179	1.292	12.84
4291.630	0.108	1.384	1.509	13.14	0.108	1.379	1.504	13.10	0.093	1.189	1.302	12.94
4294.936	0.112	1.433	1.558	13.57	0.106	1.354	1.479	12.88	0.093	1.189	1.302	12.94
	$\phi = 51°.9$				$\phi = 51°.9$				$\phi = 59°.4$			
4196.699	0.072	0.955	1.056	12.15	0.073	0.967	1.068	12.28	0.060	0.793	0.879	12.26
4197.257	0.073	0.966	1.067	12.27	0.075	0.995	1.096	12.65	0.057	0.757	0.843	11.76
4203.730	0.073	0.964	1.065	12.25	0.075	0.994	1.095	12.64	0.058	0.766	0.852	11.88
4209.144	0.074	0.977	1.078	12.40	0.074	0.978	1.079	12.41	0.064	0.849	0.935	13.04
4216.136	0.074	0.976	1.077	12.39	0.074	0.977	1.078	12.40	0.060	0.790	0.876	12.22
4220.509	0.075	0.985	1.086	12.49	0.075	0.983	1.084	12.47	0.061	0.800	0.886	12.36
4232.887	0.078	1.014	1.115	12.82	0.073	0.955	1.056	12.15	0.062	0.808	0.894	12.47
4257.815	0.076	0.984	1.085	12.48	0.076	0.985	1.086	12.49	0.064	0.828	0.914	12.75
4258.477	0.080	1.035	1.136	13.07	0.076	0.985	1.086	12.49	0.065	0.846	0.932	13.00
4265.418	0.076	0.982	1.083	12.46	0.074	0.959	1.060	12.19	0.065	0.845	0.931	12.98
4266.081	0.079	1.020	1.121	12.89	0.078	1.009	1.110	12.87	0.067	0.865	0.951	13.24
4268.915	0.074	0.957	1.058	12.17	0.075	0.969	1.070	12.32	0.062	0.798	0.884	12.33
4276.836	0.079	1.017	1.118	12.86	0.074	0.953	1.054	12.13	0.062	0.797	0.883	12.32
4284.838	0.077	0.991	1.092	12.56	0.076	0.976	1.077	12.39	0.061	0.785	0.871	12.15
4287.566	0.078	1.001	1.102	12.68	0.079	1.010	1.111	12.88	0.065	0.833	0.919	12.82
4288.310	0.077	0.986	1.087	12.50	0.081	1.034	1.135	13.05	0.064	0.819	0.905	12.62
4290.377	0.078	1.000	1.101	12.67	0.080	1.023	1.124	12.93	0.064	0.819	0.905	12.62
4290.542	0.080	1.024	1.125	12.94	0.077	0.986	1.087	12.50	0.064	0.819	0.905	12.62
4291.630	0.079	1.010	1.111	12.87	0.079	1.009	1.110	12.87	0.063	0.805	0.891	12.43
4294.936	0.075	0.959	1.060	12.19	0.078	0.998	1.099	12.65	0.062	0.794	0.880	12.27

Table 4.—Results for Individual Plates. Observations of 1906–1907—Continued.

Plate ω 50. 1907, Feb. 3, $5^h\ 40^m$ G. M. T. Measured by L. on T. Distance from Limb 3.5 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
☉	313.8	10.5	12.2	77.8	30.9	1.166
☉−☊	239.4	19.5	20.5	69.5	18.1	1.052
P	13.0	35.5	36.0	54.0	10.6	1.017
D	−6.3	51.5	51.8	38.2	7.9	1.009
Diameter	174.1 mm	66.5	66.7	23.3	6.8	1.008
Factor	1.042	82.5	82.5	7.5	6.3	1.006

λ	ϕ = 7°.5				ϕ = 23°.3				ϕ = 38°.2			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.141	1.861	2.002	14.32	0.128	1.700	1.834	14.18	0.104	1.383	1.500	13.55
4197.257	0.141	1.861	2.002	14.32	0.129	1.713	1.847	14.28	0.105	1.395	1.512	13.66
4203.730	0.143	1.888	2.029	14.52	0.130	1.721	1.855	14.34	0.106	1.400	1.517	13.70
4209.144	0.144	1.896	2.037	14.57	0.130	1.719	1.853	14.32	0.106	1.399	1.516	13.70
4216.136	0.142	1.867	2.008	14.37	0.129	1.699	1.834	14.18	0.104	1.374	1.491	13.47
4220.509	0.144	1.892	2.033	14.54	0.130	1.712	1.846	14.27	0.106	1.397	1.514	13.68
4232.887	0.143	1.872	2.013	14.40	0.130	1.705	1.839	14.22	0.106	1.391	1.508	13.62
4257.815	0.145	1.897	2.038	14.58	0.132	1.714	1.848	14.28	0.108	1.404	1.521	13.74
4258.477	0.143	1.854	1.995	14.27	0.130	1.688	1.822	14.08	0.108	1.403	1.520	13.73
4265.418	0.146	1.887	2.028	14.51	0.131	1.697	1.831	14.15	0.108	1.399	1.516	13.70
4266.081	0.146	1.880	2.021	14.46	0.134	1.734	1.868	14.44	0.108	1.399	1.516	13.70
4268.915	0.146	1.879	2.020	14.45	0.130	1.682	1.816	14.04	0.109	1.402	1.519	13.72
4276.836	0.145	1.863	2.004	14.34	0.131	1.689	1.823	14.09	0.108	1.390	1.507	13.61
4284.838	0.145	1.861	2.002	14.32	0.131	1.683	1.817	14.04	0.110	1.415	1.532	13.84
4287.566	0.144	1.855	1.996	14.28	0.134	1.721	1.855	14.34	0.108	1.388	1.505	13.60
4288.310	0.144	1.847	1.988	14.22	0.133	1.708	1.842	14.24	0.110	1.413	1.530	13.82
4290.377	0.144	1.847	1.988	14.22	0.131	1.681	1.815	14.03	0.107	1.378	1.495	13.51
4290.542	0.146	1.870	2.011	14.39	0.132	1.694	1.828	14.13	0.111	1.424	1.541	13.92
4291.630	0.144	1.849	1.990	14.24	0.130	1.667	1.801	13.92	0.109	1.397	1.514	13.68
4294.936	0.147	1.880	2.021	14.46	0.131	1.679	1.813	14.01	0.108	1.385	1.502	13.57

λ	ϕ = 54°.0				ϕ = 69°.5				ϕ = 77°.8				ϕ = 77°.8*			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.068	0.911	1.001	12.09	0.038	0.527	0.583	11.82	0.015	0.232	0.266	8.94	0.016	0.253	0.287	9.64
4197.257	0.068	0.911	1.001	12.09	0.039	0.541	0.597	12.10	0.016	0.245	0.279	9.37	0.017	0.259	0.293	9.84
4203.730	0.069	0.923	1.013	12.24	0.040	0.552	0.608	12.33	0.019	0.292	0.326	10.95	0.021	0.329	0.363	12.20
4209.144	0.071	0.946	1.036	12.51	0.040	0.551	0.607	12.31	0.018	0.276	0.310	10.41	0.020	0.306	0.340	11.42
4216.136	0.067	0.892	0.982	11.86	0.038	0.525	0.581	11.78	0.017	0.260	0.294	9.88	0.017	0.260	0.294	9.88
4220.509	0.069	0.918	1.008	12.18	0.040	0.549	0.605	12.26	0.017	0.259	0.293	9.84	0.021	0.317	0.351	11.79
4232.887	0.070	0.926	1.016	12.27	0.039	0.533	0.589	11.94	0.019	0.288	0.322	10.82	0.017	0.264	0.298	10.01
4257.815	0.072	0.943	1.033	12.48	0.042	0.570	0.626	12.69	0.021	0.313	0.347	11.66	0.019	0.283	0.317	10.65
4258.477	0.069	0.906	0.996	12.02	0.041	0.555	0.611	12.39	0.018	0.271	0.305	10.25	0.023	0.343	0.377	12.67
4265.418	0.071	0.928	1.018	12.30	0.041	0.554	0.610	12.37	0.018	0.270	0.304	10.21	0.019	0.282	0.316	10.62
4266.081	0.073	0.952	1.042	12.59	0.043	0.577	0.633	12.83	0.021	0.313	0.347	11.66	0.022	0.325	0.359	12.06
4268.915	0.070	0.912	1.002	12.11	0.039	0.527	0.583	11.82	0.018	0.270	0.304	10.21	0.021	0.322	0.356	11.96
4276.836	0.070	0.912	1.002	12.11	0.040	0.538	0.595	12.06	0.020	0.299	0.333	11.19	0.022	0.324	0.358	12.03
4284.838	0.073	0.948	1.038	12.54	0.041	0.551	0.607	12.30	0.019	0.283	0.317	10.64	0.020	0.301	0.335	11.25
4287.566	0.072	0.936	1.026	12.39	0.042	0.565	0.619	12.55	0.018	0.269	0.303	10.18	0.019	0.285	0.319	10.72
4288.310	0.072	0.935	1.025	12.38	0.040	0.537	0.593	12.02	0.019	0.282	0.316	10.62	0.019	0.280	0.314	10.55
4290.377	0.073	0.944	1.034	12.49	0.040	0.537	0.593	12.02	0.019	0.282	0.316	10.62	0.020	0.298	0.332	11.15
4290.542	0.072	0.932	1.022	12.35	0.041	0.548	0.605	12.26	0.018	0.268	0.302	10.15	0.023	0.345	0.379	12.73
4291.630	0.068	0.880	0.970	11.71	0.041	0.548	0.605	12.26	0.020	0.297	0.331	11.12	0.022	0.333	0.367	12.33
4294.936	0.072	0.931	1.021	12.33	0.044	0.589	0.640	12.97	0.018	0.268	0.302	10.15	0.018	0.269	0.303	10.18

*Measured by A. on G.

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 56. 1907, Feb. 15, 6^h 5^m G. M. T. Measured by L. on T. Distance from Limb 3.4 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
		°	°	°	°	
⊙	325.9	19.4	20.5	69.5	19.9	1.064
⊙−☊	251.5	35.4	36.0	54.0	11.7	1.021
P	17.5	51.4	51.7	38.3	8.8	1.012
D	−6.9	67.4	67.6	22.4	7.4	1.008
Diameter	174.0 mm	82.4	82.5	7.5	6.9	1.007
Factor	1.041					

λ	ϕ = 7°.5				ϕ = 22°.4				ϕ = 38°.3			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.141	1.871	2.012	14.41	0.127	1.691	1.825	14.01	0.098	1.307	1.422	12.86
4197.257	0.142	1.883	2.024	14.49	0.128	1.701	1.835	14.08	0.098	1.307	1.422	12.86
4203.730	0.143	1.892	2.033	14.56	0.131	1.734	1.868	14.33	0.102	1.350	1.465	13.25
4209.144	0.143	1.889	2.030	14.54	0.131	1.732	1.866	14.32	0.101	1.337	1.452	13.14
4216.136	0.142	1.872	2.013	14.41	0.128	1.790	1.824	14.00	0.100	1.324	1.439	13.02
4220.509	0.143	1.881	2.022	14.48	0.132	1.732	1.866	14.32	0.103	1.359	1.474	13.34
4232.887	0.143	1.858	1.999	14.31	0.132	1.730	1.864	14.30	0.102	1.341	1.456	13.17
4257.815	0.147	1.907	2.048	14.67	0.135	1.749	1.883	14.45	0.106	1.374	1.489	13.47
4258.477	0.145	1.881	2.022	14.48	0.132	1.709	1.843	14.14	0.102	1.329	1.444	13.07
4265.418	0.144	1.862	2.003	14.34	0.133	1.721	1.855	14.23	0.103	1.335	1.450	13.12
4266.081	0.146	1.888	2.029	14.53	0.135	1.746	1.880	14.43	0.106	1.372	1.487	13.45
4268.915	0.147	1.898	2.039	14.60	0.132	1.703	1.837	14.10	0.104	1.346	1.461	13.22
4276.836	0.145	1.868	2.009	14.39	0.134	1.727	1.861	14.28	0.104	1.345	1.460	13.21
4284.838	0.146	1.874	2.015	14.43	0.133	1.709	1.843	14.14	0.103	1.329	1.444	13.07
4287.566	0.146	1.873	2.014	14.42	0.133	1.708	1.842	14.13	0.104	1.340	1.455	13.16
4288.310	0.144	1.848	1.989	14.24	0.133	1.707	1.841	14.13	0.104	1.339	1.454	13.16
4290.377	0.145	1.858	1.999	14.31	0.133	1.706	1.840	14.12	0.104	1.338	1.453	13.15
4290.542	0.145	1.858	1.999	14.31	0.134	1.717	1.851	14.20	0.105	1.349	1.464	13.25
4291.630	0.144	1.844	1.985	14.21	0.133	1.704	1.838	14.10	0.103	1.325	1.440	13.03
4294.936	0.146	1.868	2.009	14.39	0.134	1.716	1.850	14.20	0.104	1.336	1.451	13.13

λ	ϕ = 54°.0				ϕ = 69°.5			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
4196.699	0.067	0.910	1.000	12.08	0.038	0.533	0.586	11.88
4197.257	0.069	0.932	1.022	12.34	0.038	0.533	0.586	11.88
4203.730	0.072	0.969	1.059	12.79	0.042	0.587	0.640	12.97
4209.144	0.072	0.966	1.056	12.75	0.042	0.586	0.639	12.95
4216.136	0.068	0.909	0.999	12.07	0.038	0.530	0.583	11.82
4220.509	0.071	0.951	1.041	12.57	0.042	0.582	0.635	12.87
4232.887	0.072	0.959	1.049	12.67	0.041	0.547	0.600	12.16
4257.815	0.074	0.971	1.061	12.82	0.043	0.588	0.641	12.99
4258.477	0.072	0.947	1.037	12.53	0.041	0.544	0.597	12.10
4265.418	0.072	0.945	1.035	12.50	0.042	0.573	0.626	12.69
4266.081	0.074	0.969	1.059	12.79	0.044	0.600	0.653	13.24
4268.915	0.072	0.944	1.034	12.49	0.040	0.542	0.595	12.06
4276.836	0.073	0.956	1.046	12.63	0.042	0.568	0.621	12.59
4284.838	0.072	0.943	1.033	12.48	0.041	0.555	0.608	12.33
4287.566	0.074	0.964	1.054	12.73	0.041	0.554	0.607	12.31
4288.310	0.073	0.953	1.043	12.60	0.041	0.554	0.607	12.31
4290.377	0.071	0.919	1.009	12.19	0.041	0.554	0.607	12.31
4290.542	0.073	0.952	1.042	12.58	0.041	0.553	0.606	12.28
4291.630	0.074	0.963	1.053	12.72	0.043	0.580	0.633	12.83
4294.936	0.076	0.986	1.076	13.00	0.041	0.533	0.586	11.88

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 60. 1907, Feb. 28, $7^h\ 15^m$ G. M. T. Measured by L. on T. Distance from Limb 3.0 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	339.1	38.9	39.5	50.5	11.4	1.020
⊙ − ☊	264.7	45.9	46.3	43.7	10.0	1.015
P	21.4	54.7	55.0	35.0	8.8	1.012
D	−7.2	61.7	61.9	28.1	8.2	1.010
Diameter	173.2 mm	69.4	69.6	20.4	7.7	1.009
Factor	1.036	83.4	83.5	6.5	7.4	1.008

λ	$\phi = 6°.5$				$\phi = 6°.5$				$\phi = 20°.4$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.144	1.904	2.044	14.60	0.143	1.892	2.032	14.52	0.128	1.697	1.830	13.86
4197.257	0.144	1.904	2.044	14.60	0.144	1.804	2.044	14.60	0.130	1.717	1.850	14.01
4203.730	0.146	1.927	2.067	14.78	0.146	1.928	2.068	14.78	0.130	1.716	1.849	14.00
4209.144	0.147	1.936	2.076	14.83	0.145	1.909	2.049	14.64	0.131	1.725	1.858	14.07
4216.136	0.146	1.918	2.058	14.71	0.146	1.931	2.071	14.79	0.129	1.697	1.830	13.86
4220.509	0.146	1.915	2.055	14.68	0.146	1.929	2.069	14.78	0.131	1.719	1.852	14.03
4232.887	0.147	1.919	2.059	14.71	0.148	1.932	2.072	14.80	0.132	1.724	1.857	14.06
4257.815	0.150	1.940	2.080	14.86	0.151	1.951	2.091	14.94	0.133	1.721	1.854	14.04
4258.477	0.148	1.908	2.048	14.63	0.147	1.901	2.041	14.58	0.132	1.708	1.841	13.94
4265.418	0.147	1.895	2.035	14.54	0.148	1.908	2.048	14.63	0.131	1.691	1.824	13.82
4266.081	0.147	1.895	2.035	14.54	0.150	1.933	2.073	14.81	0.135	1.744	1.877	14.22
4268.915	0.148	1.905	2.045	14.61	0.149	1.912	2.052	14.66	0.133	1.714	1.847	13.99
4276.836	0.146	1.873	2.013	14.38	0.149	1.912	2.052	14.66	0.132	1.696	1.829	13.85
4284.838	0.149	1.907	2.047	14.63	0.146	1.868	2.008	14.35	0.134	1.717	1.850	14.01
4287.566	0.149	1.906	2.046	14.62	0.149	1.906	2.046	14.62	0.131	1.678	1.811	13.71
4288.310	0.149	1.905	2.045	14.61	0.147	1.869	2.009	14.35	0.132	1.690	1.823	13.80
4290.377	0.147	1.877	2.017	14.41	0.146	1.865	2.005	14.32	0.134	1.703	1.836	13.90
4290.542	0.147	1.877	2.017	14.41	0.149	1.903	2.043	14.59	0.132	1.689	1.822	13.80
4291.630	0.146	1.864	2.004	14.32	0.148	1.887	2.027	14.48	0.133	1.700	1.833	13.88
4294.936	0.148	1.887	2.027	14.48	0.148	1.887	2.027	14.48	0.134	1.710	1.843	13.96

λ	$\phi = 28°.1$				$\phi = 35°.0$				$\phi = 43°.7$				$\phi = 50°.5$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.114	1.510	1.636	13.17	0.104	1.380	1.497	12.97	0.086	1.144	1.247	12.24	0.073	0.977	1.068	11.92
4197.257	0.114	1.510	1.636	13.17	0.104	1.380	1.497	12.97	0.087	1.158	1.261	12.38	0.074	0.989	1.080	12.05
4203.730	0.118	1.562	1.678	13.50	0.106	1.401	1.518	13.16	0.088	1.168	1.271	12.48	0.075	1.002	1.093	12.20
4209.144	0.118	1.557	1.683	13.55	0.106	1.400	1.517	13.15	0.089	1.182	1.285	12.62	0.075	1.000	1.091	12.18
4216.136	0.114	1.501	1.627	13.09	0.105	1.384	1.501	13.01	0.087	1.152	1.255	12.32	0.074	0.985	1.076	12.01
4220.509	0.120	1.572	1.698	13.67	0.107	1.406	1.523	13.20	0.089	1.174	1.277	12.54	0.077	1.021	1.112	12.41
4232.887	0.120	1.570	1.696	13.65	0.107	1.401	1.518	13.16	0.090	1.182	1.285	12.62	0.076	1.004	1.095	12.22
4257.815	0.122	1.580	1.706	13.73	0.109	1.413	1.530	13.26	0.093	1.210	1.313	12.89	0.078	1.020	1.111	12.40
4258.477	0.121	1.563	1.689	13.59	0.108	1.397	1.514	13.12	0.092	1.193	1.297	12.74	0.077	1.008	1.099	12.27
4265.418	0.120	1.550	1.676	13.49	0.108	1.396	1.513	13.11	0.092	1.192	1.295	12.72	0.076	0.993	1.084	12.10
4266.081	0.123	1.582	1.708	13.75	0.109	1.409	1.526	13.23	0.094	1.220	1.323	12.99	0.079	1.029	1.120	12.50
4268.915	0.120	1.548	1.674	13.47	0.108	1.395	1.512	13.10	0.092	1.189	1.292	12.69	0.077	1.004	1.095	12.22
4276.836	0.122	1.568	1.694	13.63	0.110	1.415	1.532	13.28	0.091	1.176	1.279	12.56	0.076	0.989	1.080	12.05
4284.838	0.121	1.552	1.678	13.50	0.108	1.387	1.504	13.04	0.093	1.197	1.300	12.77	0.078	1.011	1.102	12.30
4287.566	0.122	1.566	1.694	13.63	0.108	1.387	1.504	13.04	0.092	1.186	1.289	12.66	0.076	0.985	1.076	12.01
4288.310	0.121	1.552	1.678	13.50	0.109	1.398	1.515	13.13	0.092	1.185	1.288	12.65	0.078	1.009	1.100	12.28
4290.377	0.122	1.564	1.690	13.60	0.108	1.385	1.502	13.02	0.092	1.184	1.287	12.64	0.075	0.972	1.063	11.86
4290.542	0.121	1.550	1.676	13.49	0.109	1.397	1.514	13.12	0.092	1.182	1.285	12.62	0.077	0.996	1.087	12.13
4291.630	0.122	1.560	1.686	13.57	0.108	1.384	1.501	13.01	0.093	1.193	1.296	12.73	0.078	1.008	1.099	12.27
4294.936	0.122	1.559	1.685	13.56	0.108	1.383	1.500	13.00	0.092	1.181	1.284	12.61	0.078	1.007	1.098	12.26

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 61. 1907, Feb. 28, 7^h 40^m G. M. T. Measured by L. on T. Distance from Limb 3.1 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	339.1	23.7	24.7	65.3	17.5	1.049
⊙−☊	264.7	29.7	30.5	59.5	14.3	1.032
P	21.4	38.9	39.5	50.5	11.4	1.020
D	−7.2	45.9	46.3	43.7	10.0	1.016
Diameter	173.2 mm					
Factor	1.037					

λ	$\phi = 43°.7$				$\phi = 50°.5$				$\phi = 59°.5$				$\phi = 59°.5$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
4197.257	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
4203.730	0.086	1.144	1.247	12.25	0.076	1.015	1.106	12.34	0.054	0.730	0.801	11.20	0.056	0.757	0.828	11.58
4209.144	0.088	1.148	1.251	12.28	0.077	1.026	1.117	12.47	0.058	0.781	0.852	11.92	0.055	0.742	0.813	11.37
4216.136	0.085	1.127	1.230	12.08	0.073	0.971	1.062	11.85	0.054	0.728	0.799	11.18	0.053	0.713	0.784	10.97
4220.509	0.086	1.139	1.242	12.20	0.076	1.009	1.100	12.28	0.058	0.779	0.850	11.89	0.055	0.739	0.810	11.33
4232.887	0.088	1.158	1.261	12.38	0.076	1.004	1.095	12.22	0.056	0.752	0.823	11.51	0.056	0.749	0.820	11.47
4257.815	0.090	1.174	1.277	12.54	0.079	1.034	1.125	12.56	0.060	0.803	0.874	12.22	0.060	0.794	0.865	12.10
4258.477	0.089	1.157	1.260	12.37	0.079	1.033	1.124	12.55	0.057	0.754	0.825	11.54	0.058	0.765	0.836	11.69
4265.418	....	....	....	....	0.077	1.005	1.096	12.23	0.058	0.768	0.839	11.74	0.060	0.791	0.862	12.06
4266.081	0.092	1.196	1.309	12.85	0.079	1.030	1.121	12.51	0.060	0.792	0.863	12.07	....	....	....	....
4268.915	....	....	....	....	0.078	1.015	1.106	12.34	0.059	0.778	0.849	11.88	0.060	0.791	0.862	12.06
4276.836	0.096	1.163	1.266	12.43	0.078	1.013	1.104	12.32	0.057	0.749	0.820	11.47	0.058	0.761	0.832	11.64
4284.838	0.096	1.161	1.264	12.41	0.079	1.024	1.115	12.44	0.058	0.760	0.831	11.62	0.058	0.760	0.831	11.62
4287.566	0.092	1.186	1.289	12.66	0.079	1.023	1.114	12.43	0.057	0.746	0.817	11.43	0.058	0.760	0.831	11.62
4288.310	0.091	1.175	1.278	12.55	0.079	1.022	1.113	12.42	0.060	0.785	0.856	11.97	0.059	0.773	0.844	11.80
4290.377	0.091	1.173	1.276	12.53	0.077	0.995	1.086	12.12	0.059	0.772	0.843	11.79	0.059	0.773	0.844	11.80
4290.542	0.090	1.159	1.262	12.39	0.080	1.034	1.125	12.56	0.058	0.760	0.831	11.62	0.060	0.784	0.855	11.96
4291.630	0.091	1.172	1.275	12.52	0.078	1.008	1.099	12.27	0.058	0.758	0.829	11.60	0.060	0.784	0.855	11.96
4294.936	0.090	1.157	1.260	12.37	0.077	0.994	1.085	12.11	0.059	0.771	0.842	11.78	0.058	0.758	0.829	11.60
	$\phi = 65°.3$				$\phi = 65°.3$				$\phi = 65°.3$ *				$\phi = 65°.3$ *			
4196.699	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
4197.257	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
4203.730	0.044	0.605	0.664	11.28	0.045	0.618	0.677	11.50	0.046	0.633	0.692	11.75	0.047	0.652	0.711	12.08
4209.144	0.045	0.617	0.676	11.49	0.045	0.617	0.676	11.49	0.047	0.676	0.735	12.49	0.047	0.640	0.699	11.88
4216.136	0.043	0.587	0.646	10.98	0.043	0.587	0.646	10.98	0.048	0.652	0.711	12.08	0.045	0.621	0.680	11.55
4220.509	0.044	0.602	0.661	11.23	0.044	0.600	0.659	11.19	0.047	0.645	0.704	11.96	0.047	0.642	0.701	11.91
4232.887	0.045	0.611	0.670	11.38	0.047	0.638	0.697	11.84	0.050	0.669	0.728	12.37	0.049	0.669	0.728	12.37
4257.815	0.048	0.646	0.705	11.98	0.048	0.646	0.705	11.98	0.049	0.659	0.718	12.20	0.045	0.636	0.695	11.81
4258.477	0.046	0.619	0.678	11.52	0.047	0.631	0.690	11.72	0.051	0.684	0.743	12.62	0.050	0.673	0.732	12.44
4265.418	0.046	0.618	0.677	11.50	0.045	0.604	0.663	11.26	0.047	0.629	0.688	11.69	0.051	0.685	0.744	12.64
4266.081	0.048	0.644	0.703	11.94	0.048	0.643	0.702	11.93	0.051	0.687	0.746	12.67	0.048	0.645	0.704	11.96
4268.915	0.048	0.643	0.702	11.93	....	....	....	....	0.052	0.698	0.757	12.86	0.054	0.719	0.778	13.22
4276.836	0.045	0.602	0.661	11.23	0.046	0.615	0.674	11.45	0.051	0.680	0.739	12.56	0.050	0.672	0.731	12.42
4284.838	0.046	0.614	0.673	11.43	0.047	0.626	0.685	11.64	0.052	0.694	0.753	12.79	0.053	0.712	0.771	13.10
4287.566	0.047	0.625	0.684	11.62	0.047	0.625	0.684	11.62	0.049	0.656	0.715	12.15	0.052	0.687	0.746	12.67
4288.310	0.047	0.625	0.684	11.62	0.047	0.626	0.685	11.64	0.049	0.653	0.712	12.10	0.049	0.656	0.715	12.15
4290.377	0.048	0.638	0.697	11.84	0.047	0.625	0.684	11.62	0.048	0.645	0.704	11.96	0.051	0.682	0.741	12.59
4290.542	0.045	0.598	0.657	11.16	0.046	0.612	0.671	11.40	0.049	0.650	0.709	12.05	0.049	0.650	0.709	12.05
4291.630	0.047	0.624	0.683	11.60	0.046	0.611	0.670	11.38	0.052	0.697	0.756	12.84	0.049	0.650	0.709	12.05
4294.936	0.048	0.637	0.696	11.82	0.046	0.610	0.669	11.37	0.050	0.668	0.727	12.35	0.048	0.639	0.698	11.86

* Measured by A. on G.

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 62. 1907, Feb. 28, $9^h\ 15^m$ G. M. T. Measured by L. on T. Distance from Limb 3.1 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
☉	339.1	51.5	51.9	38.1	9.2	1.013
☉−☊	264.7	59.5	59.8	30.2	8.4	1.011
P	21.4	67.3	67.5	22.5	7.8	1.009
D	−7.2	74.3	74.4	15.6	7.5	1.009
Diameter	173.2 mm	82.0	82.1	7.9	7.3	1.008
Factor	1.037	96.0	96.0	−6.0	7.3	1.008

λ	$\phi = -6\overset{\circ}{.}0$				$\phi = 7\overset{\circ}{.}9$				$\phi = 15\overset{\circ}{.}6$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.144	1.905	2.045	14.60	0.138	1.831	1.971	14.13	0.138	1.829	1.965	14.48
4197.257	0.144	1.905	2.045	14.60	0.139	1.842	1.982	14.21	0.139	1.840	1.976	14.57
4203.730	0.145	1.914	2.054	14.66	0.142	1.880	2.020	14.48	0.142	1.875	2.011	14.82
4209.144	0.146	1.923	2.063	14.72	0.142	1.877	2.017	14.46	0.142	1.872	2.008	14.80
4216.136	0.144	1.891	2.031	14.50	0.141	1.854	1.994	14.29	0.141	1.854	1.990	14.67
4220.509	0.147	1.926	2.066	14.74	0.142	1.864	2.004	14.36	0.142	1.864	2.000	14.74
4232.887	0.148	1.931	2.071	14.78	0.144	1.879	2.019	14.47	0.144	1.880	2.016	14.86
4257.815	0.150	1.938	2.078	14.83	0.147	1.897	2.037	14.60	0.147	1.900	2.036	15.01
4258.477	0.146	1.887	2.027	14.47	0.146	1.874	2.014	14.44	0.144	1.872	2.008	14.80
4265.418	0.147	1.895	2.035	14.52	0.144	1.869	2.009	14.40	0.144	1.867	2.003	14.76
4266.081	0.150	1.933	2.073	14.80	0.144	1.868	2.008	14.39	0.144	1.866	2.002	14.76
4268.915	0.147	1.889	2.029	14.48	0.144	1.867	2.007	14.38	0.144	1.865	2.001	14.75
4276.836	0.147	1.887	2.027	14.47	0.145	1.864	2.004	14.36	0.145	1.862	1.998	14.73
4284.838	0.148	1.894	2.034	14.52	0.144	1.830	1.970	14.12	0.144	1.845	1.981	14.60
4287.566	0.146	1.868	2.008	14.33	0.143	1.825	1.965	14.08	0.143	1.830	1.966	14.47
4288.310	0.150	1.917	2.057	14.68	0.144	1.844	1.984	14.22	0.144	1.842	1.978	14.58
4290.377	0.148	1.890	2.030	14.49	0.143	1.830	1.970	14.12	0.142	1.828	1.964	14.48
4290.542	0.148	1.890	2.030	14.49	0.144	1.842	1.982	14.21	0.144	1.840	1.976	14.57
4291.630	0.146	1.865	2.005	14.31	0.145	1.853	1.993	14.28	0.145	1.851	1.987	14.65
4294.936	0.148	1.887	2.027	14.47	0.145	1.859	1.999	14.33	0.145	1.857	1.993	14.69

λ	$\phi = 22\overset{\circ}{.}5$				$\phi = 30\overset{\circ}{.}2$				$\phi = 38\overset{\circ}{.}1$			
4196.699	0.124	1.644	1.775	13.64	0.115	1.517	1.641	13.48	0.105	1.396	1.509	13.61
4197.257	0.123	1.628	1.759	13.52	0.116	1.529	1.653	13.58	0.105	1.396	1.509	13.61
4203.730	0.126	1.664	1.795	13.79	0.118	1.548	1.672	13.73	0.107	1.415	1.528	13.79
4209.144	0.127	1.673	1.804	13.86	0.118	1.547	1.671	13.73	0.107	1.413	1.526	13.77
4216.136	0.125	1.645	1.776	13.65	0.116	1.527	1.651	13.55	0.106	1.399	1.512	13.64
4220.509	0.126	1.655	1.786	13.72	0.118	1.544	1.668	13.70	0.107	1.409	1.522	13.73
4232.887	0.128	1.672	1.803	13.85	0.118	1.543	1.667	13.69	0.106	1.391	1.504	13.57
4257.815	0.131	1.694	1.825	14.02	0.120	1.554	1.678	13.78	0.110	1.428	1.541	13.90
4258.477	0.130	1.681	1.812	13.92	0.119	1.541	1.665	13.68	0.108	1.402	1.515	13.67
4265.418	0.128	1.650	1.781	13.69	0.118	1.521	1.645	13.51	0.108	1.400	1.513	13.65
4266.081	0.130	1.676	1.807	13.89	0.120	1.549	1.673	13.74	0.110	1.424	1.537	13.87
4268.915	0.130	1.675	1.806	13.88	0.118	1.518	1.642	13.49	0.108	1.389	1.502	13.55
4276.836	0.129	1.656	1.787	13.73	0.118	1.518	1.642	13.49	0.108	1.389	1.502	13.55
4284.838	0.131	1.678	1.809	1[illegible].90	0.116	1.490	1.614	13.26	0.107	1.378	1.491	13.45
4287.566	0.130	1.662	1.793	13.78	0.117	1.501	1.625	13.35	0.108	1.388	1.501	13.54
4288.310	0.129	1.649	1.780	13.68	0.122	1.560	1.684	13.83	0.108	1.388	1.501	13.54
4290.377	0.130	1.660	1.791	13.76	0.118	1.511	1.635	13.43	0.107	1.375	1.488	13.42
4290.542	0.127	1.623	1.754	13.48	0.120	1.535	1.659	13.63	0.108	1.387	1.500	13.53
4291.630	0.128	1.634	1.765	13.56	0.120	1.534	1.658	13.62	0.109	1.397	1.510	13.62
4294.936	0.128	1.633	1.764	13.56	0.120	1.533	1.657	13.61	0.110	1.409	1.522	13.73

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 63. 1907, Feb. 28, 9^h 45^m G. M. T. Measured by L. on T. Distance from Limb 3.1 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	339.1	45.8	46.2	43.8	10.0	1.016
⊙−☊	264.7	38.8	39.3	50.7	11.5	1.021
P	21.4	54.6	54.9	35.1	8.8	1.012
D	−7.2	61.6	61.8	28.2	8.2	1.010
Diameter	173.2 mm	69.3	69.4	20.6	7.7	1.009
Factor	1.037	82.8	82.8	7.2	7.3	1.008

λ	$\phi = 7°.2$				$\phi = 20°.6$				$\phi = 28°.2$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.143	1.905	2.045	14.63	0.126	1.668	1.801	13.66	0.114	1.510	1.636	13.18
4197.257	0.144	1.918	2.058	14.73	0.128	1.694	1.827	13.86	0.116	1.536	1.662	13.39
4203.730	0.147	1.953	2.093	14.98	0.120	1.600	1.733	13.14	0.118	1.560	1.686	13.58
4209.144	0.142	1.885	2.025	14.49	0.129	1.700	1.833	13.90	0.119	1.570	1.696	13.66
4216.136	0.144	1.905	2.045	14.63	0.130	1.708	1.841	13.96	0.118	1.553	1.679	13.53
4220.509	0.144	1.902	2.042	14.61	0.132	1.730	1.863	14.13	0.120	1.575	1.701	13.70
4232.887	0.146	1.920	2.060	14.74	0.133	1.736	1.869	14.18	0.120	1.569	1.695	13.65
4257.815	0.150	1.953	2.093	14.98	0.133	1.719	1.852	14.05	0.120	1.555	1.681	13.54
4258.477	0.148	1.927	2.067	14.79	0.133	1.719	1.852	14.05	0.118	1.526	1.652	13.31
4265.418	0.147	1.896	2.036	14.57	0.132	1.702	1.835	13.92	0.118	1.524	1.650	13.29
4266.081	0.150	1.947	2.087	14.93	0.133	1.715	1.848	14.02	0.124	1.602	1.728	13.92
4268.915	0.146	1.894	2.034	14.55	0.134	1.725	1.858	14.09	0.120	1.545	1.671	13.46
4276.836	0.147	1.901	2.041	14.61	0.133	1.708	1.841	13.96	0.120	1.542	1.668	13.44
4284.838	0.149	1.921	2.061	14.75	0.134	1.716	1.849	14.02	0.123	1.579	1.705	13.73
4287.566	0.148	1.906	2.046	14.64	0.136	1.738	1.871	14.19	0.121	1.549	1.675	13.49
4288.310	0.146	1.881	2.021	14.46	0.134	1.713	1.846	14.00	0.124	1.588	1.714	13.81
4290.377	0.147	1.892	2.032	14.54	0.134	1.712	1.845	13.99	0.118	1.510	1.636	13.18
4290.542	0.148	1.903	2.043	14.62	0.135	1.724	1.857	14.08	0.120	1.535	1.661	13.38
4291.630	0.148	1.902	2.042	14.61	0.134	1.711	1.844	13.99	0.119	1.522	1.648	13.28
4294.936	0.148	1.901	2.041	14.61	0.132	1.685	1.818	13.79	0.118	1.508	1.634	13.16

λ	$\phi = 35°.1$				$\phi = 50°.7$				$\phi = 43°.8$			
4196.699	0.105	1.396	1.513	13.13	0.068	0.912	1.002	11.23	0.086	1.150	1.254	12.33
4197.257	0.106	1.409	1.526	13.25	0.069	0.924	1.014	11.36	0.088	1.174	1.278	12.57
4203.730	0.108	1.431	1.548	13.44	0.072	0.962	1.052	11.79	0.090	1.199	1.303	12.82
4209.144	0.108	1.428	1.545	13.40	0.071	0.948	1.038	11.63	0.089	1.181	1.285	12.64
4216.136	0.106	1.399	1.516	13.16	0.071	0.945	1.035	11.60	0.087	1.152	1.256	12.35
4220.509	0.110	1.447	1.564	13.57	0.073	0.971	1.061	11.89	0.090	1.188	1.292	12.71
4232.887	0.108	1.412	1.529	13.27	0.071	0.939	1.029	11.53	0.090	1.183	1.287	12.66
4257.815	0.111	1.440	1.557	13.51	0.076	0.995	1.085	12.16	0.094	1.224	1.328	13.06
4258.477	0.108	1.399	1.516	13.16	0.075	0.982	1.072	12.02	0.090	1.172	1.276	12.55
4265.418	0.107	1.385	1.502	13.03	0.075	0.982	1.072	12.02	0.089	1.157	1.261	12.40
4266.081	0.112	1.449	1.566	13.59	0.075	0.984	1.074	12.04	0.092	1.194	1.298	12.77
4268.915	0.110	1.422	1.539	13.36	0.076	0.989	1.079	12.09	0.091	1.180	1.284	12.63
4276.836	0.108	1.394	1.511	13.11	0.076	0.988	1.078	12.08	0.090	1.165	1.269	12.48
4284.838	0.110	1.415	1.532	13.29	0.078	1.012	1.102	12.35	0.092	1.186	1.290	12.69
4287.566	0.110	1.413	1.530	13.28	0.074	0.959	1.049	11.76	0.092	1.185	1.289	12.68
4288.310	0.112	1.437	1.554	13.48	0.074	0.958	1.048	11.75	0.090	1.160	1.264	12.43
4290.377	0.108	1.387	1.504	13.05	0.076	0.983	1.073	12.03	0.091	1.171	1.275	12.54
4290.542	0.111	1.424	1.541	13.37	0.074	9.957	1.047	11.74	0.093	1.196	1.300	12.79
4291.630	0.112	1.435	1.552	13.47	0.076	0.982	1.072	12.02	0.092	1.182	1.286	12.65
4294.936	0.112	1.434	1.551	13.46	0.077	0.995	1.085	12.16	0.092	1.182	1.286	12.65

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 55. 1907, Feb. 15, $5^h\ 40^m$ G. M. T. Measured by L. on T. Distance from Limb 3.4 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η	
	°	°	°	°	°		
⊙	325.9	51.4	51.7	38.3	8.8	1.012	D −6.9
⊙−☊	251.5	67.4	67.6	22.4	7.4	1.008	Diameter 174.0 mm
P	17.5	82.4	82.5	7.5	6.9	1.007	Factor 1.041

λ	$\phi = 7°.5$				$\phi = 22°.4$				$\phi = 38°.3$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.142	1.884	2.025	14.50	0.129	1.711	1.845	14.16	0.098	1.304	1.419	12.84
4197.257	0.142	1.884	2.025	14.50	0.129	1.711	1.845	14.16	0.097	1.292	1.407	12.73
4203.730	0.146	1.924	2.065	14.79	0.130	1.721	1.855	14.23	0.102	1.354	1.469	13.29
4209.144	0.147	1.936	2.077	14.87	0.131	1.730	1.864	14.30	0.103	1.364	1.479	13.38
4216.136	0.145	1.910	2.051	14.69	0.129	1.699	1.833	14.07	0.099	1.314	1.429	12.93
4220.509	0.146	1.918	2.059	14.74	0.131	1.723	1.857	14.25	0.103	1.361	1.476	13.35
4232.887	0.147	1.924	2.065	14.79	0.132	1.728	1.862	14.28	0.104	1.368	1.483	13.42
4257.815	0.149	1.923	2.064	14.78	0.135	1.741	1.875	14.39	0.106	1.378	1.493	13.51
4258.477	0.146	1.898	2.039	14.60	0.131	1.696	1.830	14.04	0.105	1.365	1.480	13.39
4265.418	0.148	1.919	2.060	14.75	0.131	1.695	1.829	14.03	0.104	1.352	1.467	13.27
4266.081	0.151	1.953	2.094	14.99	0.135	1.738	1.872	14.37	0.108	1.395	1.510	13.66
4268.915	0.149	1.918	2.059	14.74	0.134	1.725	1.859	14.27	0.104	1.347	1.462	13.23
4276.836	0.148	1.903	2.044	14.64	0.132	1.700	1.834	14.07	0.103	1.334	1.449	13.11
4284.838	0.149	1.913	2.054	14.71	0.134	1.722	1.856	14.24	0.104	1.342	1.457	13.18
4287.566	0.147	1.885	2.026	14.51	0.133	1.709	1.843	14.14	0.104	1.341	1.456	13.17
4288.310	0.149	1.910	2.051	14.69	0.133	1.708	1.842	14.13	0.106	1.365	1.480	13.39
4290.377	0.146	1.871	2.012	14.41	0.133	1.707	1.841	14.13	0.105	1.352	1.467	13.27
4290.542	0.148	1.896	2.037	14.59	0.134	1.715	1.849	14.19	0.102	1.315	1.430	12.94
4291.630	0.148	1.895	2.036	14.58	0.134	1.714	1.848	14.18	0.105	1.350	1.465	13.25
4294.936	0.148	1.894	2.035	14.57	0.131	1.678	1.812	13.90	0.108	1.387	1.502	13.59

Plates ω 64, ω 67, ω 68, and ω 69. 1907, April 7, ω 64, $3^h\ 20^m$; ω 67, $5^h\ 45^m$; ω 68, $6^h\ 45^m$; ω 69, $7^h\ 10^m$. G. M. T. Measured by L. on T. Distance from Limb 2.3 mm. Quality, good.

	ω 64, 67	ω 68, 69	$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	°	
⊙	16.7	16.8	10.9	12.5	77.5	29.5	1.149
⊙−☊	302.3	302.4					
		°					
P		26.5	Diameter 171.7 mm				
D		−6.1	Factor 1.027				

λ	ω 64, $\phi = 77°.5$				ω 67, $\phi = 77°.5$				ω 68, $\phi = 77°.5$				ω 69, $\phi = 77°.5$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.020	0.298	0.333	10.92	0.018	0.269	0.304	9.97	0.018	0.269	0.304	9.97	0.020	0.298	0.333	10.92
4197.257	0.022	0.304	0.339	11.12	0.020	0.298	0.333	10.92	0.020	0.298	0.333	10.92	0.020	0.298	0.333	10.92
4203.730	0.023	0.342	0.377	12.37	0.022	0.327	0.362	11.87	0.022	0.328	0.363	11.91	0.022	0.328	0.363	11.91
4209.144	0.022	0.303	0.338	11.09	0.022	0.327	0.362	11.87	0.022	0.328	0.363	11.91	0.021	0.312	0.347	11.38
4216.136	0.020	0.295	0.330	10.82	0.019	0.282	0.317	10.40	0.019	0.282	0.317	10.40	0.020	0.296	0.331	10.86
4220.509	0.022	0.324	0.359	11.78	0.022	0.325	0.360	11.81	0.022	0.326	0.361	11.84	0.024	0.355	0.390	12.79
4232.887	0.022	0.324	0.359	11.78	0.022	0.324	0.359	11.78	0.022	0.323	0.358	11.74	0.024	0.351	0.386	12.66
4257.815	0.024	0.349	0.384	12.60	0.026	0.380	0.415	13.61	0.026	0.380	0.415	13.61	0.028	0.408	0.443	14.53
4258.477	0.024	0.349	0.384	12.60	0.022	0.323	0.358	11.74	0.024	0.349	0.384	12.60	0.024	0.349	0.384	12.60
4265.418	0.024	0.349	0.384	12.60	0.023	0.335	0.370	12.14	0.022	0.322	0.357	11.71	0.022	0.320	0.355	11.64
4266.081	0.025	0.363	0.398	13.06	0.026	0.379	0.414	13.58	0.025	0.363	0.398	13.06	0.024	0.349	0.384	12.60
4268.915	0.023	0.334	0.369	12.10	0.024	0.347	0.382	12.53	0.023	0.334	0.369	12.10	0.022	0.320	0.355	11.64
4276.836	0.022	0.319	0.354	11.61	0.024	0.347	0.382	12.53	0.024	0.348	0.383	12.56	0.024	0.348	0.383	12.56
4284.838	0.022	0.319	0.354	11.61	0.024	0.347	0.382	12.53	0.024	0.348	0.383	12.56	0.022	0.320	0.355	11.64
4287.566	0.021	0.303	0.338	11.09	0.025	0.361	0.396	12.99	0.022	0.317	0.352	11.55	0.024	0.347	0.382	12.53
4288.310	0.022	0.318	0.353	11.58	0.024	0.347	0.382	12.53	0.023	0.332	0.367	12.04	0.024	0.347	0.382	12.53
4290.377	0.025	0.361	0.396	12.99	0.022	0.317	0.352	11.55	0.024	0.347	0.382	12.53	0.022	0.319	0.354	11.61
4290.542	0.023	0.332	0.367	12.04	0.023	0.332	0.367	12.04	0.026	0.374	0.409	13.42	0.024	0.346	0.381	12.50
4291.630	0.025	0.360	0.395	12.96	0.028	0.404	0.439	14.40	0.025	0.360	0.395	12.96	0.024	0.346	0.381	12.50
4294.936	0.022	0.317	0.352	11.55	0.024	0.346	0.381	12.50	0.024	0.346	0.381	12.50	0.023	0.332	0.367	12.04

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 81. 1907, April 22, 8^h 20^m G. M. T. $\phi = 79°.5$, measured by A. on T. $\phi = 67°.2$ and $72°.5$ measured by L. on T. Distance from Limb 1.1 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	31.5	9.3	10.5	79.5	28.1	1.134
⊙−Ω	317.1	16.8	17.5	72.5	16.6	1.044
P	25.7	22.3	22.8	67.2	12.8	1.026
D	−4.9					
Diameter	169.3 mm					
Factor	1.013					

λ	$\phi = 67°.2$				$\phi = 67°.2$				$\phi = 72°.5$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.042	0.553	0.617	11.30	0.041	0.541	0.605	11.08	0.032	0.429	0.480	11.33
4197.257	0.042	0.553	0.617	11.30	0.042	0.553	0.617	11.30	0.033	0.441	0.492	11.62
4203.730	0.043	0.564	0.628	11.51	0.044	0.577	0.641	11.74	0.034	0.454	0.505	11.92
4209.144	0.045	0.588	0.652	11.95	0.045	0.588	0.652	11.95	0.034	0.453	0.504	11.90
4216.136	0.044	0.575	0.639	11.71	0.040	0.523	0.587	10.75	0.033	0.439	0.490	11.57
4220.509	0.044	0.572	0.636	11.65	0.044	0.574	0.638	11.69	0.034	0.451	0.502	11.85
4232.887	0.046	0.596	0.660	12.09	0.048	0.617	0.681	12.48	0.035	0.459	0.510	12.04
4257.815	0.049	0.628	0.692	12.68	0.048	0.615	0.679	12.44	0.036	0.470	0.521	12.30
4258.477	0.048	0.615	0.679	12.44	0.045	0.577	0.641	11.74	0.034	0.444	0.495	11.69
4265.418	0.046	0.590	0.654	11.98	0.046	0.590	0.654	11.98	0.034	0.444	0.495	11.69
4266.081	0.050	0.638	0.702	12.86	0.048	0.613	0.677	12.40	0.037	0.482	0.533	12.58
4268.915	0.047	0.600	0.664	12.16	0.046	0.587	0.651	11.93	0.033	0.430	0.481	11.36
4276.836	0.048	0.613	0.677	12.40	0.045	0.575	0.639	11.71	0.036	0.465	0.516	12.18
4284.838	0.044	0.559	0.623	11.41	0.047	0.598	0.662	12.13	0.034	0.440	0.591	11.59
4287.566	0.048	0.610	0.674	12.35	0.048	0.611	0.675	12.37	0.036	0.465	0.516	12.18
4288.310	0.048	0.610	0.674	12.35	0.046	0.584	0.648	11.87	0.034	0.440	0.491	11.59
4290.377	0.047	0.598	0.662	12.13	0.045	0.573	0.637	11.67	0.035	0.452	0.503	11.88
4290.542	0.045	0.572	0.636	11.65	0.047	0.597	0.661	12.11	0.034	0.439	0.490	11.57
4291.630	0.047	0.597	0.661	12.11	0.047	0.597	0.661	12.11	0.034	0.439	0.490	11.57
4294.936	0.048	0.609	0.673	12.33	0.048	0.609	0.673	12.33	0.036	0.464	0.515	12.16

λ	$\phi = 72°.5$				$\phi = 79°.5$				$\phi = 79°.5$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
4196.699	0.032	0.428	0.479	11.31	0.019	0.277	0.311	12.12	0.019	0.281	0.315	12.27
4197.257	0.031	0.416	0.467	11.03	0.019	0.278	0.312	12.15	0.019	0.278	0.312	12.15
4203.730	0.034	0.454	0.505	11.92	0.020	0.282	0.316	12.31	0.020	0.293	0.327	12.74
4209.144	0.034	0.453	0.504	11.90	0.019	0.279	0.313	12.19	0.019	0.281	0.315	12.27
4216.136	0.032	0.425	0.476	11.24	0.019	0.280	0.314	12.23	0.020	0.281	0.315	12.27
4220.509	0.034	0.452	0.503	11.88	0.020	0.293	0.327	12.74	0.020	0.282	0.316	12.31
4232.887	0.033	0.436	0.487	11.50	0.020	0.282	0.316	12.31	0.019	0.276	0.310	12.08
4257.815	0.036	0.470	0.521	12.30	0.021	0.293	0.327	12.74	0.021	0.294	0.328	12.78
4258.477	0.034	0.443	0.494	11.66	0.021	0.293	0.327	12.74	0.020	0.286	0.320	12.47
4265.418	0.034	0.443	0.494	11.66	0.020	0.279	0.313	12.19	0.020	0.276	0.310	12.08
4266.081	0.036	0.470	0.521	12.30	0.020	0.284	0.318	12.39	0.020	0.284	0.318	12.39
4268.915	0.034	0.442	0.493	11.64	0.020	0.280	0.314	12.23	0.020	0.282	0.316	12.31
4276.836	0.034	0.441	0.492	11.62	0.020	0.282	0.316	12.31	0.020	0.278	0.312	12.15
4284.838	0.033	0.427	0.478	11.29	0.019	0.272	0.306	11.92	0.020	0.278	0.312	12.15
4287.566	0.034	0.440	0.491	11.59	0.020	0.277	0.311	12.12	0.020	0.285	0.319	12.43
4288.310	0.035	0.453	0.504	11.90	0.019	0.272	0.306	11.92	0.020	0.279	0.313	12.19
4290.377	0.035	0.452	0.503	11.88	0.019	0.272	0.306	11.92	0.019	0.272	0.306	11.92
4290.542	0.036	0.464	0.515	12.16	0.020	0.280	0.314	12.23	0.019	0.266	0.300	11.69
4291.630	0.035	0.453	0.504	11.90	0.020	0.282	0.316	12.31	0.020	0.274	0.308	12.00
4294.936	0.036	0.464	0.515	12.16	0.020	0.282	0.316	12.31	0.020	0.277	0.311	12.12

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 83. 1907, May 10, $10^h\ 15^m$ G. M. T. Measured by A. on G. Distance from Limb 1.1 mm. Quality, good.

	°	$p-P$	π	ϕ	η	sec η
		°	°	°	°	
☉	49.1	10.4	10.8	79.2	16.7	1.044
☉−☊	−25.3	15.4	15.6	74.4	11.6	1.021
P	22.4	26.4	26.5	63.5	6.9	1.007
D	−3.0					
Diameter	168.2 mm					
Factor	1.013					

λ	$\phi = 63^\circ.5$				$\phi = 63^\circ.5$				$\phi = 74^\circ.4$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.048	0.624	0.697	11.09	0.049	0.636	0.709	11.28	0.030	0.393	0.443	11.70
4197.257	0.050	0.651	0.724	11.52	0.048	0.623	0.696	11.07	0.030	0.388	0.438	11.56
4203.730	0.049	0.630	0.703	11.19	0.051	0.658	0.731	11.63	0.029	0.382	0.432	11.40
4209.144	0.049	0.628	0.701	11.15	0.052	0.665	0.738	11.74	0.030	0.386	0.436	11.51
4216.136	0.050	0.637	0.710	11.30	0.048	0.622	0.695	11.06	0.030	0.390	0.440	11.62
4220.509	0.049	0.631	0.704	11.21	0.052	0.667	0.740	11.77	0.029	0.380	0.430	11.35
4232.887	0.048	0.618	0.691	10.99	0.051	0.656	0.729	11.60	0.030	0.393	0.443	11.69
4257.815	0.050	0.636	0.709	11.28	0.053	0.669	0.742	11.81	0.030	0.384	0.434	11.46
4258.477	0.050	0.634	0.707	11.25	0.052	0.655	0.728	11.58	0.030	0.379	0.429	11.32
4265.418	0.050	0.629	0.702	11.17	0.050	0.634	0.707	11.25	0.031	0.390	0.440	11.62
4266.081	0.050	0.627	0.700	11.14	0.050	0.627	0.700	11.14	0.032	0.409	0.459	12.12
4268.915	0.051	0.641	0.714	11.36	0.051	0.646	0.719	11.44	0.029	0.370	0.420	11.09
4276.836	0.049	0.612	0.685	10.90	0.054	0.677	0.750	11.93	0.029	0.371	0.421	11.12
4284.838	0.049	0.610	0.683	10.87	0.051	0.635	0.708	11.26	0.030	0.380	0.430	11.35
4287.566	0.049	0.617	0.690	10.98	0.050	0.629	0.702	11.17	0.031	0.394	0.444	11.72
4288.310	0.050	0.629	0.702	11.17	0.051	0.639	0.712	11.33	0.031	0.394	0.444	11.72
4290.377	0.050	0.623	0.696	11.07	0.052	0.650	0.723	11.50	0.028	0.354	0.434	11.46
4290.542	0.050	0.623	0.696	11.07	0.052	0.648	0.721	11.47	0.031	0.387	0.437	11.54
4291.630	0.050	0.623	0.696	11.07	0.052	0.653	0.726	11.55	0.030	0.384	0.434	11.46
4294.936	0.049	0.613	0.686	10.92	0.052	0.647	0.720	11.46	0.030	0.383	0.433	11.43

λ	$\phi = 74^\circ.4$				$\phi = 79^\circ.2$				$\phi = 79^\circ.2$			
4196.699	0.031	0.404	0.454	11.99	0.019	0.252	0.293	11.10	0.019	0.255	0.296	11.21
4197.257	0.032	0.424	0.474	12.51	0.019	0.257	0.298	11.29	0.018	0.247	0.288	10.91
4203.730	0.032	0.418	0.468	12.36	0.020	0.268	0.309	11.71	0.020	0.273	0.314	11.90
4209.144	0.032	0.418	0.468	12.36	0.020	0.267	0.308	11.67	0.020	0.270	0.311	11.78
4216.136	0.031	0.401	0.451	11.91	0.020	0.272	0.313	11.86	0.019	0.248	0.289	10.95
4220.509	0.033	0.429	0.479	12.65	0.020	0.260	0.301	11.40	0.020	0.271	0.312	11.82
4232.887	0.032	0.409	0.459	12.12	0.020	0.270	0.311	11.78	0.020	0.261	0.302	11.44
4257.815	0.034	0.435	0.485	12.80	0.020	0.261	0.302	11.44	0.020	0.256	0.297	11.25
4258.477	0.034	0.430	0.480	12.67	0.019	0.251	0.292	11.06	0.019	0.246	0.287	10.87
4265.418	0.034	0.432	0.482	12.72	0.020	0.267	0.308	11.67	0.020	0.256	0.297	11.25
4266.081	0.032	0.432	0.482	12.72	0.021	0.274	0.315	11.93	0.020	0.261	0.302	11.44
4268.915	0.032	0.411	0.461	12.17	0.020	0.266	0.307	11.63	0.019	0.246	0.287	10.87
4276.836	0.032	0.404	0.454	11.98	0.020	0.262	0.303	11.48	0.020	0.264	0.305	11.56
4284.838	0.033	0.413	0.463	12.22	0.020	0.259	0.300	11.37	0.020	0.256	0.297	11.25
4287.566	0.032	0.405	0.455	12.01	0.021	0.269	0.310	11.75	0.020	0.254	0.295	11.18
4288.310	0.031	0.389	0.439	11.59	0.020	0.261	0.302	11.44	0.020	0.261	0.302	11.44
4290.377	0 032	0.395	0.445	11.75	0.018	0.233	0.274	10.38	0.020	0.258	0.299	11.33
4290.542	0.033	0.412	0.462	12.20	0.019	0.248	0.289	10.95	0.020	0.258	0.299	11.33
4291.630	0.034	0.432	0.482	12.72	0.021	0.269	0.310	11.75	0.020	0.258	0.299	11.33
4294.936	0.032	0.399	0.449	11.85	0.020	0.253	0.294	11.14	0.021	0.273	0.314	11.90

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 85. 1907, May 30, $12^h\ 5^m$ G. M. T. Measured by A. on T. Distance from Limb 1.0 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	68.4	10.2	10.2	79.8	4.2	1.003
⊙−☊	−6.0	15.2	15.2	74.8	2.8	1.001
P	16.3	26.2	26.2	63.8	1.7	1.000
D	−0.7					
Diameter	167.9 mm					
Factor	1.012					

λ	ϕ = 63°.8				ϕ = 63°.8				ϕ = 74°.8			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.054	0.692	0.760	12.22	0.055	0.704	0.772	12.41	0.032	0.410	0.461	12.48
4197.257	0.054	0.692	0.760	12.22	0.055	0.704	0.772	12.41	0.032	0.410	0.461	12.48
4203.730	0.055	0.703	0.771	12.40	0.058	0.741	0.809	13.01	0.034	0.434	0.485	13.13
4209.144	0.058	0.740	0.808	12.99	0.056	0.714	0.782	12.57	0.034	0.433	0.484	13.11
4216.136	0.056	0.712	0.780	12.54	0.055	0.699	0.767	12.33	0.034	0.432	0.483	13.08
4220.509	0.056	0.711	0.779	12.52	0.058	0.737	0.805	12.95	0.034	0.432	0.483	13.08
4232.887	0.058	0.734	0.802	12.90	0.058	0.734	0.802	12.90	0.033	0.419	0.470	12.73
4257.815	0.058	0.727	0.795	12.78	0.058	0.727	0.795	12.78	0.033	0.413	0.464	12.56
4258.477	0.056	0.702	0.770	12.38	0.057	0.713	0.781	12.56	0.034	0.426	0.477	12.92
4265.418	0.058	0.725	0.793	12.75	0.060	0.749	0.817	13.14	0.035	0.438	0.489	13.24
4266.081	0.058	0.724	0.792	12.74	0.058	0.724	0.792	12.73	0.036	0.450	0.501	13.57
4268.915	0.057	0.710	0.778	12.51	0.059	0.736	0.804	12.93	0.033	0.412	0.463	12.54
4276.836	0.059	0.734	0.802	12.90	0.060	0.736	0.804	12.93	0.033	0.410	0.461	12.48
4284.838	0.059	0.732	0.800	12.86	0.060	0.744	0.812	13.06	0.035	0.434	0.485	13.13
4287.566	0.057	0.706	0.774	12.45	0.059	0.731	0.799	12.85	0.035	0.433	0.484	13.10
4288.310	0.057	0.706	0.774	12.45	0.060	0.743	0.811	13.04	0.032	0.396	0.447	12.10
4290.377	0.056	0.693	0.761	12.24	0.058	0.718	0.786	12.64	0.034	0.421	0.472	12.78
4290.542	0.057	0.705	0.773	12.43	0.058	0.718	0.786	12.64	0.033	0.408	0.459	12.43
4291.630	0.058	0.717	0.785	12.62	0.058	0.704	0.772	12.41	0.034	0.420	0.471	12.75
4294.936	0.058	0.717	0.785	12.62	0.058	0.717	0.785	12.62	0.034	0.420	0.471	12.75
	ϕ = 74°.8				ϕ = 79°.8				ϕ = 79°.8			
4196.699	0.032	0.410	0.461	12.48	0.019	0.247	0.287	11.51	0.018	0.236	0.276	11.06
4197.257	0.029	0.372	0.423	11.45	0.019	0.242	0.282	11.31	0.018	0.231	0.271	10.86
4203.730	0.031	0.397	0.448	12.13	0.020	0.257	0.297	11.91	0.019	0.247	0.287	11.51
4209.144	0.031	0.396	0.447	12.10	0.020	0.256	0.296	11.87	0.020	0.256	0.296	11.87
4216.136	0.030	0.382	0.433	11.72	0.019	0.238	0.278	11.15	0.018	0.234	0.274	10.98
4220.509	0.034	0.432	0.483	13.08	0.020	0.255	0.295	11.83	0.021	0.265	0.305	12.23
4232.887	0.032	0.405	0.456	12.34	0.020	0.249	0.289	11.59	0.021	0.264	0.304	12.19
4257.815	0.034	0.426	0.487	13.19	0.021	0.259	0.299	11.99	0.020	0.251	0.291	11.67
4258.477	0.031	0.389	0.440	11.91	0.020	0.254	0.294	11.79	0.021	0.266	0.306	12.27
4265.418	0.032	0.400	0.451	12.21	0.020	0.246	0.286	11.47	0.019	0.243	0.283	11.35
4266.081	0.034	0.424	0.475	12.87	0.020	0.271	0.311	12.47	0.020	0.246	0.286	11.47
4268.915	0.032	0.399	0.450	12.19	0.021	0.265	0.305	12.23	0.020	0.255	0.295	11.83
4276.836	0.035	0.435	0.486	13.16	0.020	0.254	0.294	11.79	0.019	0.240	0.280	11.23
4284.838	0.032	0.397	0.448	12.13	0.020	0.249	0.289	11.59	0.020	0.244	0.284	11.39
4287.566	0.034	0.421	0.472	12.78	0.020	0.248	0.288	11.55	0.020	0.244	0.284	11.39
4288.310	0.036	0.445	0.496	13.43	0.020	0.248	0.288	11.55	0.020	0.246	0.286	11.47
4290.377	0.035	0.433	0.484	13.10	0.020	0.243	0.283	11.35	0.020	0.248	0.288	11.55
4290.542	0.036	0.445	0.495	13.40	0.020	0.253	0.293	11.75	0.020	0.251	0.291	11.67
4291.630	0.035	0.433	0.484	13.10	0.019	0.241	0.281	11.27	0.020	0.248	0.288	11.55
4294.936	0.034	0.420	0.471	12.75	0.020	0.243	0.283	11.35	0.021	0.262	0.302	12.11

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 85 – Continued. 1907, May 30, 12^h 5^m G. M. T. Measured by L. on T. Distance from Limb 1.0 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
☉	68.4	15.2	15.2	74.8	2.8	1.001
☉–☊	–6.0	26.2	26.2	63.8	1.7	1.000
P	16.3					

D –0.7
Diameter 167.9 mm
Factor 1.012

λ	$\phi = 63°.8$				$\phi = 63°.8$				$\phi = 74°.8$				$\phi = 74°.8$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.049	0.627	0.695	11.18	0.048	0.613	0.681	10.95	0.030	0.385	0.436	11.81	0.029	0.371	0.422	11.43
4197.257	0.049	0.640	0.708	11.38	0.048	0.613	0.681	10.95	0.031	0.397	0.448	12.13	0.029	0.371	0.422	11.43
4203.730	0.050	0.637	0.704	11.34	0.052	0.664	0.732	11.77	0.032	0.406	0.457	12.37	0.030	0.384	0.435	11.78
4209.144	0.052	0.662	0.730	11.74	0.052	0.661	0.729	11.72	0.032	0.405	0.456	12.35	0.031	0.395	0.446	12.08
4216.136	0.051	0.647	0.715	11.50	0.050	0.634	0.702	11.27	0.030	0.382	0.433	11.72	0.030	0.382	0.433	11.72
4220.509	0.053	0.672	0.740	11.90	0.052	0.659	0.727	11.69	0.033	0.417	0.468	12.67	0.032	0.405	0.456	12.35
4232.887	0.053	0.669	0.737	11.85	0.053	0.661	0.737	11.85	0.033	0.417	0.468	12.67	0.032	0.405	0.456	12.35
4257.815	0.055	0.685	0.753	12.11	0.055	0.689	0.757	12.17	0.036	0.449	0.500	13.54	0.034	0.425	0.476	12.89
4258.477	0.053	0.659	0.727	11.69	0.053	0.661	0.729	11.72	0.034	0.423	0.474	12.83	0.033	0.387	0.438	11.86
4265.418	0.054	0.670	0.738	11.87	0.051	0.636	0.704	11.32	0.032	0.399	0.450	12.18	0.033	0.387	0.438	11.86
4266.081	0.055	0.683	0.751	12.08	0.054	0.672	0.740	11.90	0.035	0.435	0.486	13.16	0.036	0.448	0.499	13.51
4268.915	0.054	0.670	0.738	11.87	0.054	0.670	0.738	11.87	0.032	0.398	0.449	12.16	0.034	0.423	0.474	12.83
4276.836	0.054	0.670	0.738	11.87	0.051	0.633	0.701	11.27	0.033	0.410	0.461	12.48	0.031	0.386	0.437	11.83
4284.838	0.053	0.656	0.724	11.64	0.053	0.655	0.723	11.63	0.033	0.409	0.460	12.45	0.034	0.421	0.472	12.78
4287.566	0.053	0.655	0.723	11.63	0.054	0.667	0.735	11.82	0.032	0.396	0.447	12.10	0.033	0.409	0.460	12.46
4288.310	0.053	0.655	0.723	11.63	0.053	0.655	0.723	11.63	0.033	0.408	0.459	12.43	0.034	0.421	0.472	12.78
4290.377	0.056	0.692	0.760	12.22	0.052	0.643	0.711	11.43	0.034	0.420	0.471	12.75	0.032	0.396	0.447	12.10
4290.542	0.055	0.680	0.748	12.03	0.054	0.667	0.735	11.82	0.033	0.408	0.459	12.43	0.034	0.420	0.471	12.75
4291.630	0.054	0.667	0.735	11.82	0.054	0.667	0.735	11.82	0.036	0.444	0.495	13.40	0.034	0.420	0.471	12.75
4294.936	0.052	0.642	0.710	11.42	0.053	0.654	0.722	11.61	0.034	0.420	0.471	12.75	0.033	0.408	0.459	12.43

Plate ω 91. 1907, June 23, 5^h 55^m G. M. T. Measured by L. on T. Distance from Limb 1.2 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
☉	91.1	37.0	37.0	53.0	3.4	1.002
☉–☊	16.7	52.7	52.7	37.3	2.6	1.001
P	6.4	68.2	68.2	21.8	2.2	1.001
D	2.1	83.2	83.2	6.8	2.1	1.001

Diameter 168.1 mm
Factor 1.014

λ	$\phi = 6°.8$				$\phi = 21°.8$				$\phi = 37°.3$				$\phi = 53°.0$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.148	1.901	2.035	14.55	0.130	1.669	1.798	13.76	0.102	1.312	1.429	12.75	0.076	0.978	1.071	12.63
4197.257	0.148	1.900	2.034	14.55	0.130	1.669	1.798	13.76	0.102	1.311	1.428	12.74	0.076	0.977	1.070	12.62
4203.730	0.150	1.919	2.053	14.68	0.132	1.691	1.820	13.93	0.104	1.331	1.448	12.92	0.077	0.987	1.080	12.74
4209.144	0.150	1.917	2.051	14.67	0.132	1.688	1.817	13.91	0.104	1.328	1.445	12.89	0.078	1.000	1.093	12.89
4216.136	0.149	1.900	2.034	14.55	0.130	1.658	1.787	13.67	0.104	1.325	1.442	12.87	0.078	0.997	1.090	12.86
4220.509	0.150	1.906	2.040	14.59	0.132	1.678	1.807	13.83	0.104	1.325	1.442	12.87	0.078	0.995	1.088	12.83
4232.887	0.150	1.901	2.035	14.55	0.132	1.673	1.802	13.79	0.105	1.332	1.449	12.93	0.078	0.990	1.083	12.78
4257.815	0.152	1.909	2.043	14.61	0.135	1.691	1.820	13.93	0.107	1.344	1.461	13.04	0.080	1.005	1.098	12.95
4258.477	0.152	1.907	2.041	14.60	0.133	1.667	1.796	13.74	0.106	1.330	1.447	12.91	0.078	0.980	1.073	12.66
4265.418	0.152	1.905	2.039	14.58	0.133	1.665	1.794	13.73	0.107	1.340	1.457	13.00	0.079	0.991	1.084	12.79
4266.081	0.153	1.914	2.048	14.65	0.134	1.677	1.806	13.82	0.108	1.352	1.469	13.11	0.080	1.002	1.095	12.92
4268.915	0.152	1.892	2.026	14.49	0.134	1.671	1.800	13.77	0.107	1.324	1.441	12.86	0.080	1.000	1.093	12.89
4276.836	0.152	1.891	2.025	14.48	0.134	1.668	1.797	13.75	0.107	1.322	1.439	12.84	0.081	1.010	1.103	12.89
4284.838	0.152	1.889	2.023	14.46	0.134	1.666	1.795	13.74	0.107	1.331	1.448	12.92	0.080	0.997	1.090	12.86
4287.566	0.153	1.902	2.036	14.56	0.135	1.677	1.806	13.82	0.109	1.354	1.471	13.13	0.079	0.985	1.078	12.72
4288.310	0.153	1.899	2.033	14.54	0.135	1.676	1.805	13.81	0.107	1.328	1.445	12.89	0.081	1.007	1.100	12.98
4290.377	0.152	1.885	2.019	14.44	0.134	1.675	1.804	13.80	0.106	1.310	1.427	12.73	0.080	0.995	1.088	12.83
4290.542	0.153	1.895	2.029	14.51	0.136	1.686	1.815	13.89	0.107	1.329	1.446	12.90	0.080	0.993	1.086	12.81
4291.630	0.152	1.883	2.017	14.42	0.135	1.673	1.802	13.79	0.108	1.340	1.457	13.00	0.082	1.018	1.111	13.11
4294.936	0.153	1.894	2.028	14.50	0.136	1.684	1.813	13.87	0.108	1.338	1.455	12.98	0.082	1.010	1.103	13.01

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 86. 1907, May 31, $4^h\ 55^m$ G. M. T. Measured by A. on G. Distance from Limb 1.3 mm. Quality, Good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	69.1	8.9	8.9	81.1	4.4	1.003
⊙−☊	−5.3	13.9	13.9	76.1	2.8	1.001
P	16.0	25.9	25.9	64.1	1.6	1.000
D	−0.6	45.2	45.2	44.8	0.9	1.000
Diameter	168.5 mm	60.2	60.2	29.8	0.8	1.000
Factor	1.016	75.2	75.2	14.8	0.7	1.000

λ	ϕ = 14°.8				ϕ = 29°.8				ϕ = 44°.8			
	Δ	v	$v+v_1$	ξ	Δ	v	$v-v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.143	1.837	1.971	14.47	0.116	1.493	1.617	13.23	0.095	1.225	1.331	13.31
4197.257	0.142	1.826	1.960	14.39	0.120	1.544	1.668	13.65	0.092	1.183	1.289	12.89
4203.730	0.142	1.827	1.961	14.40	0.119	1.525	1.649	13.48	0.094	1.208	1.314	13.14
4209.144	0.146	1.874	2.008	14.74	0.124	1.582	1.706	13.96	0.098	1.249	1.355	13.55
4216.136	0.142	1.809	1.943	14.27	0.116	1.481	1.605	13.13	0.096	1.226	1.332	13.32
4220.509	0.146	1.861	1.995	14.64	0.121	1.546	1.670	13.66	0.100	1.269	1.375	13.75
4232.887	0.147	1.863	1.997	14.66	0.123	1.564	1.688	13.81	0.091	1.160	1.266	12.66
4257.815	0.143	1.793	1.927	14.15	0.121	1.527	1.651	13.50	0.096	1.207	1.313	13.13
4258.477	0.149	1.873	2.007	14.74	0.125	1.569	1.693	13.85	0.100	1.262	1.368	13.68
4265.418	0.148	1.855	1.989	14.61	0.121	1.515	1.639	13.40	0.094	1.176	1.282	12.82
4266.081	0.142	1.779	1.913	14.05	0.127	1.590	1.714	14.03	0.092	1.154	1.260	12.60
4268.915	0.146	1.824	1.958	14.38	0.123	1.538	1.662	13.60	0.092	1.162	1.268	12.68
4276.836	0.147	1.833	1.967	14.45	0.127	1.584	1.708	13.98	0.095	1.188	1.294	12.94
4284.838	0.147	1.828	1.962	14.41	0.128	1.594	1.718	14.06	0.095	1.187	1.293	12.93
4287.566	0.144	1.796	1.930	14.17	0.123	1.531	1.655	13.54	....	....	....	....
4288.310	0.142	1.766	1.904	13.96	0.124	1.537	1.661	13.59	0.094	1.169	1.275	12.75
4290.377	0.147	1.824	1.958	14.38	0.125	1.551	1.675	13.70	0.096	1.192	1.298	12.98
4290.542	0.149	1.849	1.983	14.56	0.123	1.531	1.655	13.54	0.096	1.197	1.303	13.03
4291.630	0.150	1.867	2.001	14.69	0.125	1.557	1.681	13.75	0.094	1.175	1.281	12.81
4294.936	0.149	1.850	1.984	14.57	0.123	1.529	1.653	13.52	0.095	1.180	1.286	12.86
	ϕ = 64°.1				ϕ = 76°.1				ϕ = 81°.1			
4196.699	0.052	0.664	0.738	12.00	0.025	0.322	0.370	10.93	0.018	0.232	0.269	12.34
4197.257	0.053	0.682	0.756	12.27	0.024	0.309	0.357	10.55	0.019	0.242	0.279	12.80
4203.730	0.057	0.729	0.803	13.05	0.028	0.355	0.403	11.91	0.018	0.231	0.268	12.30
4209.144	0.055	0.701	0.775	12.60	0.028	0.354	0.402	11.88	0.019	0.244	0.281	12.89
4216.136	0.054	0.685	0.759	12.32	0.025	0.322	0.370	10.93	0.017	0.218	0.255	11.70
4220.509	0.055	0.702	0.776	12.61	0.029	0.368	0.416	12.29	0.019	0.245	0.282	12.94
4232.887	0.056	0.711	0.785	12.76	0.028	0.356	0.404	11.94	0.018	0.224	0.261	11.98
4257.815	0.058	0.698	0.772	12.55	0.030	0.378	0.426	12.59	0.019	0.241	0.278	12.76
4258.477	0.056	0.703	0.777	12.63	0.031	0.388	0.436	12.88	0.019	0.236	0.273	12.53
4265.418	0.056	0.699	0.773	12.57	0.031	0.392	0.440	13.00	0.018	0.228	0.265	12.16
4266.081	0.057	0.718	0.792	12.87	0.030	0.377	0.425	12.56	0.019	0.238	0.275	12.62
4268.915	0.054	0.671	0.745	12.10	0.028	0.356	0.404	11.94	0.018	0.223	0.260	11.93
4276.836	0.057	0.715	0.789	12.84	0.031	0.390	0.438	12.94	0.018	0.220	0.257	11.79
4284.838	0.055	0.680	0.754	12.24	0.028	0.345	0.393	11.61	0.017	0.212	0.249	11.43
4287.566	0.057	0.712	0.786	12.78	0.031	0.388	0.436	12.88	0.018	0.224	0.261	11.98
4288.310	0.056	0.698	0.772	12.55	0.028	0.349	0.397	11.73	0.019	0.234	0.271	12.44
4290.377	0.053	0.656	0.730	11.87	0.030	0.363	0.411	12.14	0.018	0.226	0.263	12.07
4290.542	0.056	0.691	0.765	12.42	0.028	0.373	0.421	12.44	0.019	0.234	0.271	12.44
4291.630	0.059	0.730	0.804	13.07	0.030	0.368	0.416	12.29	0.019	0.238	0.275	12.62
4294.936	0.055	0.680	0.754	12.24	0.028	0.348	0.396	11.70	0.018	0.223	0.260	11.93

TABLE 4. — RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907 — Continued.

Plate ω 87. 1907, June 22, 11ʰ 10ᵐ G. M. T. Measured by L. on T. Distance from Limb 0.6 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	90.4	30.9	30.9	59.1	3.9	1.002
⊙−☊	16.0	37.9	37.9	52.1	3.2	1.002
P	6.8	51.4	51.4	38.6	2.6	1.001
D	2.0	66.9	66.9	23.1	2.2	1.001
Diameter	167.0 mm	81.9	81.9	8.1	2.0	1.001
Factor	1.007					

λ	ϕ = 8°.1				ϕ = 23°.1				ϕ = 38°.6			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.148	1.887	2.021	14.49	0.129	1.646	1.774	13.69	0.099	1.265	1.379	12.53
4197.257	0.147	1.875	2.009	14.41	0.130	1.658	1.786	13.77	0.100	1.277	1.391	12.64
4203.730	0.149	1.896	2.030	14.56	0.132	1.679	1.807	13.95	0.103	1.311	1.425	12.94
4209.144	0.150	1.901	2.035	14.59	0.133	1.689	1.817	14.02	0.103	1.305	1.419	12.89
4216.136	0.148	1.875	2.009	14.41	0.130	1.647	1.775	13.70	0.101	1.280	1.394	12.66
4220.509	0.150	1.897	2.031	14.56	0.134	1.694	1.822	14.06	0.104	1.314	1.428	12.97
4232.887	0.150	1.889	2.023	14.51	0.133	1.675	1.803	13.92	0.103	1.297	1.411	12.82
4257.815	0.153	1.905	2.039	14.62	0.136	1.696	1.824	14.08	0.106	1.320	1.434	13.03
4258.477	0.152	1.890	2.024	14.51	0.134	1.667	1.795	13.85	0.104	1.297	1.411	12.82
4265.418	0.152	1.890	2.024	14.51	0.134	1.666	1.794	13.85	0.106	1.312	1.426	12.95
4266.081	0.154	1.915	2.049	14.69	0.135	1.677	1.805	13.93	0.107	1.324	1.438	13.06
4268.915	0.153	1.895	2.029	14.55	0.134	1.664	1.792	13.83	0.107	1.323	1.437	13.05
4276.836	0.152	1.882	2.016	14.46	0.136	1.679	1.807	13.95	0.106	1.311	1.425	12.94
4284.838	0.153	1.889	2.023	14.51	0.136	1.678	1.806	13.94	0.105	1.296	1.410	12.81
4287.566	0.152	1.876	2.010	14.41	0.136	1.677	1.805	13.93	0.106	1.308	1.422	12.92
4288.310	0.152	1.875	2.009	14.41	0.135	1.665	1.793	13.84	0.105	1.294	1.408	12.79
4290.377	0.151	1.861	1.995	14.31	0.132	1.627	1.755	13.55	0.103	1.270	1.384	12.57
4290.542	0.152	1.873	2.007	14.40	0.132	1.626	1.754	13.54	0.104	1.281	1.395	12.67
4291.630	0.152	1.872	2.006	14.39	0.134	1.648	1.776	13.71	0.104	1.280	1.394	12.66
4294.936	0.153	1.882	2.016	14.46	0.133	1.636	1.764	13.62	0.104	1.280	1.394	12.66
	ϕ = 52°.1				ϕ = 52°.1				ϕ = 59°.1			
4196.699	0.072	0.922	1.024	11.83	0.074	0.946	1.040	12.02	0.059	0.755	0.837	11.57
4197.257	0.074	0.918	1.012	11.70	0.073	0.933	1.027	11.87	0.060	0.767	0.849	11.74
4203.730	0.076	0.969	1.063	12.29	0.076	0.969	1.063	12.29	0.063	0.803	0.885	12.23
4209.144	0.075	0.954	1.048	12.11	0.076	0.967	1.061	12.26	0.062	0.789	0.871	12.04
4216.136	0.073	0.926	1.020	11.79	0.074	0.939	1.033	11.94	0.060	0.762	0.844	11.67
4220.509	0.076	0.963	1.057	12.22	0.076	0.963	1.057	12.22	0.062	0.786	0.868	11.99
4232.887	0.077	0.971	1.065	12.31	0.078	0.983	1.077	12.45	0.063	0.789	0.871	12.23
4257.815	0.080	0.999	1.093	12.63	0.080	0.999	1.093	12.63	0.064	0.800	0.882	12.19
4258.477	0.078	0.970	1.064	12.30	0.078	0.973	1.067	12.33	0.063	0.787	0.869	12.01
4265.418	0.078	0.969	1.063	12.29	0.078	0.972	1.066	12.32	0.063	0.785	0.867	11.99
4266.081	0.080	0.996	1.090	12.60	0.078	0.971	1.065	12.31	0.065	0.807	0.889	12.29
4268.915	0.079	0.979	1.073	12.40	0.077	0.956	1.050	12.14	0.064	0.794	0.876	12.11
4276.836	0.078	0.967	1.061	12.26	0.077	0.955	1.049	12.13	0.065	0.806	0.888	12.28
4284.838	0.079	0.976	1.070	12.37	0.078	0.964	1.058	12.23	0.065	0.804	0.886	12.25
4287.566	0.078	0.966	1.060	12.25	0.078	0.964	1.058	12.23	0.064	0.802	0.884	12.22
4288.310	0.078	0.965	1.059	12.24	0.077	0.954	1.048	12.11	0.064	0.791	0.873	12.07
4290.377	0.079	0.974	1.068	12.34	0.077	0.952	1.046	12.09	0.063	0.778	0.860	11.89
4290.542	0.078	0.963	1.057	12.22	0.077	0.952	1.046	12.09	0.063	0.778	0.860	11.89
4291.630	0.079	0.973	1.067	12.33	0.077	0.952	1.046	12.09	0.064	0.789	0.871	12.04
4294.936	0.079	0.973	1.067	12.33	0.078	0.961	1.055	12.19	0.063	0.777	0.859	11.88

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 88. 1907, June 22, $11^h\ 40^m$ G. M. T. Measured by L. on T. Distance from Limb 0.6 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	90.4	30.9	30.9	59.1	3.9	1.002
⊙−☊	16.0	37.9	37.9	52.1	3.2	1.002
P	6.8	51.4	51.4	38.6	2.6	1.001
D	2.0	66.9	66.9	23.1	2.2	1.001
Diameter	167.0 mm	81.9	81.9	8.1	2.0	1.001
Factor	1.007					

λ	$\phi = 8^\circ.1$				$\phi = 23^\circ.1$				$\phi = 38^\circ.6$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.147	1.878	2.012	14.43	0.128	1.633	1.761	13.59	0.100	1.277	1.391	12.64
4197.257	0.148	1.888	2.022	14.50	0.128	1.633	1.761	13.59	0.099	1.264	1.378	12.52
4203.730	0.150	1.909	2.043	14.65	0.133	1.689	1.817	14.02	0.103	1.311	1.425	12.94
4209.144	0.151	1.917	2.051	14.71	0.131	1.664	1.792	13.83	0.102	1.295	1.409	12.80
4216.136	0.149	1.888	2.022	14.50	0.129	1.635	1.763	13.61	0.101	1.281	1.395	12.67
4220.509	0.152	1.922	2.056	14.74	0.132	1.669	1.797	13.87	0.103	1.303	1.417	12.87
4232.887	0.152	1.914	2.048	14.69	0.132	1.662	1.790	13.82	0.104	1.309	1.423	12 93
4257.815	0.154	1.920	2.054	14.73	0.134	1.668	1.796	13.86	0.105	1.309	1.423	12.93
4258.477	0.153	1.901	2.035	14.59	0.132	1.643	1.771	13.67	0.103	1.281	1.395	12.67
4265.418	0.153	1.899	2.033	14.58	0.132	1.642	1.770	13.66	0.103	1.279	1.393	12.65
4266.081	0.154	1.909	2.043	14.65	0.135	1.677	1.805	13.93	0.105	1.306	1.440	13.08
4268.915	0.154	1.908	2.042	14.64	0.135	1.676	1.804	13.92	0.103	1.276	1.390	12.63
4276.836	0.153	1.894	2.028	14.54	0.132	1.634	1.762	13.60	0.103	1.276	1.390	12.63
4284.838	0.153	1.885	2.019	14.48	0.134	1.654	1.782	13.75	0.104	1.284	1.398	12.70
4287.566	0.153	1.885	2.019	14.48	0.133	1.639	1.767	13.64	0.104	1.283	1.397	12.69
4288.310	0.154	1.896	2.030	14.56	0.133	1.639	1.767	13.64	0.104	1.283	1.397	12.69
4290.377	0.152	1.871	2.005	14.38	0.133	1.638	1.766	13.63	0.104	1.282	1.396	12.68
4290.542	0.152	1.882	2.016	14.46	0.134	1.650	1.778	13.72	0.104	1.281	1.395	12.67
4291.630	0.154	1.894	2.028	14.54	0.134	1.649	1.777	13.72	0.104	1.281	1.395	12.67
4294.936	0.153	1.882	2.016	14.46	0.133	1.636	1.764	13.62	0.104	1.280	1.394	12.66

λ	$\phi = 52^\circ.1$				$\phi = 52^\circ.1$				$\phi = 59^\circ.1$			
4196.699	0.074	0.949	1.043	12.05	0.073	0.937	1.031	11.92	0.059	0.758	0.840	11.61
4197.257	0.075	0.958	1.052	12.16	0.074	0.946	1.040	12.02	0.060	0.768	0.850	11.75
4203.730	0.076	0.969	1.063	12.28	0.076	0.969	1.063	12.29	0.062	0.790	0.872	12.06
4209.144	0.077	0.979	1.073	12.40	0.076	0.964	1.058	12.23	0.062	0.788	0.870	12.03
4216.136	0.075	0.952	1.046	12.09	0.074	0.939	1.033	11.94	0.060	0.761	0.843	11.65
4220.509	0.077	0.975	1.069	12.36	0.077	0.975	1.069	12.36	0.063	0.797	0.869	12.01
4232.887	0.078	0.983	1.077	12.45	0.078	0.983	1.077	12.45	0.062	0.781	0.863	11.93
4257.815	0.080	0.997	1.091	12.61	0.080	0.996	1.090	12.60	0.066	0.824	0.906	12.43
4258.477	0.079	0.983	1.077	12.45	0.078	0.971	1.065	12.31	0.062	0.772	0.854	11.81
4265.418	0.079	0.982	1.076	12.44	0.079	0.982	1.076	12.44	0.063	0.783	0.865	12.95
4266.081	0.080	0.994	1.088	12.57	0.080	0.994	1.088	12.57	0.064	0.795	0.874	12.12
4268.915	0.079	0.981	1.075	12.42	0.079	0.980	1.076	12.44	0.064	0.794	0.876	12.11
4276.836	0.080	0.992	1.086	12.55	0.080	0.992	1.086	12.55	0.064	0.793	0.875	12.10
4284.838	0.078	0.968	1.062	12.27	0.079	0.979	1.073	12.40	0.064	0.792	0.874	12.08
4287.566	0.080	0.988	1.082	12.51	0.079	0.978	1.072	12.39	0.064	0.791	0.873	12.07
4288.310	0.078	0.966	1.060	12.25	0.080	0.988	1.082	12.51	0.063	0.779	0.861	11.90
4290.377	0.078	0.965	1.059	12.24	0.079	0.976	1.070	12.37	0.063	0.777	0.859	11.88
4290.542	0.079	0.975	1.069	12.36	0.080	0.987	1.081	12.49	0.064	0.789	0.871	12.04
4291.630	0.080	0.986	1.080	12.48	0.080	0.986	1.080	12.48	0.064	0.788	0.870	12.03
4294.936	0.081	0.997	1.091	12.61	0.082	1.010	1.104	12.76	0.063	0.776	0.858	11.86

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 89. 1907, June 22, 12^h 15^m G. M. T. Measured by L. on T. Distance from Limb 0.6 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	90.4	30.5	30.5	59.5	3.9	1.003
⊙ − ☊	16.0	37.5	37.5	52.5	3.2	1.002
P	6.8	51.0	51.0	39.0	2.6	1.001
D	2.0	66.5	66.5	23.5	2.2	1.001
Diameter	167.0 mm.	81.5	81.5	8.5	2.0	1.001
Factor	1.007					

λ	$\phi = 8°.5$				$\phi = 23°.5$				$\phi = 39°.0$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.146	1.855	1.989	14.28	0.129	1.645	1.773	13.73	0.098	1.261	1.374	12.55
4197.257	0.146	1.855	1.989	14.28	0.128	1.633	1.761	13.63	0.099	1.269	1.382	12.62
4203.730	0.148	1.875	2.009	14.42	0.132	1.680	1.808	13.99	0.101	1.285	1.398	12.79
4209.144	0.147	1.863	1.997	14.34	0.132	1.676	1.804	13.96	0.102	1.295	1.408	12.86
4216.136	0.146	1.850	1.984	14.23	0.130	1.647	1.775	13.75	0.101	1.281	1.394	12.73
4220.509	0.149	1.877	2.011	14.44	0.133	1.682	1.810	14.01	0.104	1.316	1.429	13.05
4232.887	0.148	1.864	1.998	14.35	0.132	1.662	1.790	13.86	0.102	1.285	1.398	12.77
4257.815	0.150	1.871	2.005	14.39	0.136	1.693	1.821	14.10	0.105	1.311	1.424	13.01
4258.477	0.149	1.856	1.990	14.28	0.134	1.667	1.795	13.90	0.104	1.298	1.401	12.80
4265.418	0.150	1.857	1.991	14.29	0.133	1.654	1.782	13.80	0.106	1.317	1.430	13.06
4266.081	0.151	1.870	2.004	14.38	0.137	1.703	1.831	14.17	0.105	1.305	1.418	12.95
4268.915	0.148	1.838	1.972	14.16	0.135	1.672	1.800	13.93	0.104	1.292	1.405	12.84
4276.836	0.150	1.855	1 989	14.28	0.134	1.659	1.787	13.84	0.106	1.309	1.422	12.99
4284.838	0.150	1.853	1.987	14.27	0.134	1.653	1.781	13.79	0.104	1.283	1.396	12.75
4287.566	0.149	1.840	1.974	14.18	0.133	1.639	1.767	13.68	0.106	1.308	1.421	12.98
4288.310	0.148	1.825	1.959	14.06	0.133	1.639	1.767	13.68	0.104	1.281	1.394	12.73
4290.377	0.146	1.800	1.934	13.88	0.132	1.626	1.754	13.58	0.103	1.293	1.406	12.84
4290.542	0.150	1.845	1.979	14.21	0.136	1.673	1.801	13.94	0.106	1.304	1.417	12.94
4291.630	0.150	1.845	1.979	14.21	0.134	1.649	1.777	13.76	0.104	1.280	1.393	12.73
4294.936	0.147	1.845	1.979	14.21	0.133	1.636	1.764	13.66	0.104	1.280	1.393	12.73
	$\phi = 52°.5$				$\phi = 52°.5$				$\phi = 59°.5$			
4196.699	0.074	0.950	1.044	12.18	0.076	0.970	1.064	12.41	0.059	0.758	0.838	11.72
4197.257	0.074	0.950	1.044	12.18	0.076	0.970	1.064	12.41	0.060	0.766	0.846	11.83
4203.730	0.076	0.970	1.064	12.41	0.077	0.980	1.074	12.53	0.062	0.792	0.872	12.20
4209.144	0.077	0.980	1.074	12.53	0.078	0.991	1.085	12.66	0.062	0.789	0.869	12.16
4216.136	0.075	0.960	1.054	12.29	0.076	0.967	1.061	12.37	0.061	0.778	0.858	12.00
4220.509	0.077	0.976	1.070	12.48	0.079	0.999	1.093	12.75	0.062	0.786	0.866	12.11
4232.887	0.078	0.984	1.078	12.57	0.078	0.983	1.077	12.56	0.062	0.778	0.858	12.00
4257.815	0.080	1.000	1.094	12.76	0.080	0.998	1.092	12.74	0.065	0.812	0.892	12.48
4258.477	0.079	0.986	1.080	12.60	0.079	0.984	1.078	12.57	0.064	0.794	0.874	12.22
4265.418	0.079	0.985	1.079	12.58	0.081	1.009	1.103	12.86	0.065	0.805	0.885	12.38
4266.081	0.081	1.006	1.100	12.83	0.082	1.020	1.114	12.99	0.064	0.793	0.873	12.21
4268.915	0.080	0.993	1.087	12.68	0.097	0.980	1.074	12.53	0.064	0.792	0.872	12.20
4276.836	0.080	0.993	1.087	12.68	0.080	0.991	1.085	12.66	0.064	0.792	0.872	12.20
4284.838	0.081	1.003	1.097	12.79	0.080	0.988	1.082	12.62	0.065	0.803	0.883	12.35
4287.566	0.080	0.990	1.084	12.64	0.080	0.988	1.082	12.62	0.064	0.791	0.871	12.18
4288.310	0.081	1.000	1.094	12.76	0.081	1.002	1.096	12.78	0.064	0.791	0.871	12.18
4290.377	0.080	0.988	1.082	12.62	0.081	1.000	1.094	12.76	0.063	0.778	0.858	12.00
4290.542	0.080	0.987	1.081	12.61	0.081	1.001	1.094	12.76	0.062	0.767	0.847	11.85
4291.630	0.082	1.011	1.105	12.89	0.081	0.998	1.092	12.74	0.063	0.777	0.857	11.99
4294.936	0.081	0.997	1.091	12.72	0.083	1.021	1.115	13.00	0.063	0.777	0.857	11.99

TABLE 4.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1906–1907—Continued.

Plate ω 90. 1907, June 23, $5^h\ 20^m$ G. M. T. Measured by L. on T. Distance from Limb 1.2 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
$\odot$	91.1	25.5	25.6	64.4	4.6	1.004
$\odot - \Omega$	16.7	34.5	34.5	55.5	3.7	1.002
P	6.4	37.0	37.0	53.0	3.4	1.002
D	2.1	52.7	52.7	37.3	2.6	1.001
Diameter	168.1 mm	68.2	68.2	21.8	2.2	1.001
Factor	1.014	83.2	83.2	6.8	2.1	1.001

λ	$\phi = 6°.8$				$\phi = 21°.8$				$\phi = 37°.3$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.149	1.913	2.047	14.64	0.128	1.646	1.775	13.58	0.102	1.312	1.429	12.75
4197.257	0.149	1.913	2.047	14.64	0.129	1.657	1.786	13.67	0.102	1.311	1.428	12.74
4203.730	0.150	1.921	2.055	14.70	0.130	1.666	1.795	13.74	0.103	1.321	1.438	12.83
4209.144	0.151	1.925	2.059	14.72	0.130	1.662	1.791	13.70	0.104	1.330	1.447	12.91
4216.136	0.150	1.913	2.047	14.64	0.129	1.646	1.775	13.58	0.103	1.315	1.432	12.78
4220.509	0.150	1.909	2.043	14.61	0.130	1.655	1.784	13.65	0.104	1.324	1.441	12.86
4232.887	0.151	1.913	2.047	14.64	0.130	1.648	1.777	13.60	0.105	1.332	1.449	12.93
4257.815	0.153	1.920	2.054	14.69	0.131	1.651	1.780	13.62	0.104	1.307	1.424	12.70
4258.477	0.152	1.905	2.039	14.58	0.131	1.648	1.777	13.60	0.106	1.330	1.447	12.91
4265.418	0.152	1.902	2.036	14.56	0.132	1.656	1.785	13.66	0.105	1.318	1.435	12.80
4266.081	0.153	1.913	2.047	14.64	0.132	1.654	1.783	13.64	0.106	1.328	1.445	12.89
4268.915	0.152	1.899	2.033	14.54	0.132	1.650	1.779	13.61	0.106	1.326	1.443	12.88
4276.836	0.152	1.897	2.031	14.52	0.132	1.646	1.775	13.58	0.106	1.322	1.439	12.84
4284.838	0.152	1.894	2.028	14.50	0.132	1.644	1.773	13.57	0.106	1.320	1.437	12.82
4287.566	0.153	1.902	2.036	14.56	0.133	1.654	1.783	13.64	0.106	1.320	1.437	12.82
4288.310	0.153	1.899	2.033	14.54	0.134	1.664	1.793	13.72	0.106	1.318	1.435	12.80
4290.377	0.152	1.886	2.020	14.45	0.133	1.650	1.779	13.61	0.106	1.318	1.425	12.71
4290.542	0.153	1.896	2.030	14.52	0.132	1.652	1.781	13.63	0.107	1.327	1.444	12.88
4291.630	0.152	1.883	2.017	14.42	0.133	1.647	1.776	13.59	0.105	1.302	1.419	12.66
4294.936	0.153	1.894	2.028	14.50	0.133	1.647	1.776	13.59	0.107	1.324	1.441	12.86

λ	$\phi = 53°.0$				$\phi = 55°.5$				$\phi = 64°.4$			
4196.699	0.074	0.953	1.046	12.34	0.071	0.912	1.002	12.56	0.050	0.644	0.715	11.75
4197.257	0.075	0.964	1.057	12.47	0.072	0.925	1.015	12.72	0.050	0.644	0.715	11.75
4203.730	0.077	0.987	1.080	12.74	0.072	0.924	1.014	12.71	0.051	0.657	0.728	11.96
4209.144	0.076	0.973	1.066	12.58	0.072	0.921	1.011	12.67	0.051	0.655	0.726	11.93
4216.136	0.077	0.983	1.076	12.69	0.072	0.919	1.009	12.65	0.050	0.641	0.712	11.70
4220.509	0.077	0.981	1.074	12.67	0.073	0.930	1.020	12.78	0.051	0.651	0.722	11.86
4232.887	0.077	0.977	1.070	12.62	0.073	0.926	1.016	12.73	0.052	0.661	0.732	12.03
4257.815	0.079	0.993	1.086	12.81	0.075	0.941	1.031	12.92	0.054	0.680	0.751	12.34
4258.477	0.078	0.980	1.073	12.66	0.074	0.928	1.018	12.76	0.052	0.653	0.724	11.90
4265.418	0.078	0.979	1.072	12.65	0.074	0.926	1.016	12.73	0.053	0.665	0.736	12.09
4266.081	0.078	0.977	1.070	12.62	0.074	0.926	1.016	12.73	0.054	0.677	0.748	12.29
4268.915	0.078	0.975	1.068	12.60	0.073	0.912	1.002	12.56	0.054	0.675	0.746	12.26
4276.836	0.078	0.973	1.066	12.58	0.074	0.923	1.013	12.70	0.054	0.674	0.745	12.24
4284.838	0.079	0.984	1.077	12.68	0.076	0.946	1.036	12.99	0.054	0.675	0.746	12.26
4287.566	0.079	0.983	1.076	12.69	0.074	0.922	1.012	12.68	0.054	0.673	0.744	12.22
4288.310	0.080	0.995	1.088	12.83	0.075	0.932	1.022	12.81	0.053	0.661	0.732	12.03
4290.377	0.079	0.981	1.074	12.67	0.073	0.908	0.998	12.51	0.053	0.660	0.731	12.01
4290.542	0.080	0.993	1.086	12.81	0.076	0.943	1.033	12.95	0.054	0.671	0.742	12.19
4291.630	0.079	0.979	1.072	12.65	0.074	0.918	1.008	12.63	0.053	0.658	0.729	11.98
4294.936	0.080	0.991	1.084	12.79	0.074	0.917	1.007	12.62	0.052	0.646	0.717	11.78

The results for Plate ω 91 are given on page 49.

In order to arrange the results of Table 4 in a convenient form for effective discussion I have collected the values in three ways: (1) mean results for each plate from all lines; (2) mean results for each latitude from all lines; (3) mean results for each line from all plates. These summaries are found in Tables 5, 6, and 7. The values of $v + v_1$ and ξ in Table 5 are the means for the separate values given in Table 4. Table 6 is a rearrangement of Table 5 and indicates the combination of points of latitude used in the derivation of normal positions. Table 7 is found directly from the values of the individual lines and forms the basis for a discussion of the behavior of the various lines employed.

TABLE 5.—MEAN RESULTS FOR EACH PLATE FROM ALL LINES. OBSERVATIONS OF 1906–1907.

Plate No.	Date.	No. of Lines.	ϕ	$v + v_1$	ξ
	1906		°	km	°
ω 3	May 3	20	9.8	2.012	14.49
			24.7	1.805	14.11
			39.7	1.419	13.10
			54.6	1.004	12.31
			69.5	0.598	12.12
			83.6	0.192	12.23
ω 6	May 6	19	10.7	2.035	14.70
			25.7	1.793	14.13
			40.6	1.396	13.05
			55.6	0.990	12.44
			70.4	0.589	12.47
			84.6	0.177	13.35
ω 8	May 19	19	0.9	2.064	14.65
			15.4	1.921	14.52
			30.4	1.702	14.01
			45.4	1.322	13.36
			75.3	0.448	12.53
ω 19	June 12	20	0.1	2.053	14.58
			15.1	1.944	14.29
			30.1	1.675	13.74
			45.1	1.280	12.87
			60.1	0.873	12.44
			75.1	0.460	12.70
ω 20	June 12	20	0.1	2.065	14.66
			15.1	1.930	14.19
			30.1	1.661	13.62
			45.1	1.268	12.75
			60.1	0.867	12.34
			75.1	0.423	11.68
ω 21	June 12	20	0.1	2.059	14.62
			15.1	1.937	14.24
			16.1	1.938	14.31
			30.1	1.665	13.66
			45.1	1.274	12.81
			60.1	0.859	12.24
			75.1	0.428	11.41
ω 23	June 15	20	0.0	2.054	14.58
			15.0	1.934	14.22
			30.0	1.669	13.68
			45.0	1.260	12.65
			59.0	0.857	11.82
			75.0	0.436	11.95
ω 24	June 15	20	0.0	2.065	14.66
			15.0	1.937	14.24
			30.0	1.674	13.72
			45.0	1.272	12.77
			60.0	0.872	12.38
			75.0	0.419	12.04
ω 25	June 15	20	0.0	2.060	14.62
			15.0	1.960	14.41
			30.0	1.663	13.63
			45.0	1.272	12.77
			60.0	0.861	12.22
			75.0	0.437	11.98
	1906		°	km	°
ω 26	June 16	20	0.0	2.073	14.72
			15.0	1.977	14.52
			30.0	1.637	13.41
			45.0	1.276	12.80
			60.0	0.861	12.19
			74.9	0.444	13.12
ω 27	June 16	20	0.0	2.065	14.66
			15.0	1.954	14.36
			30.0	1.657	13.59
			45.0	1.270	12.75
			60.0	0.827	11.74
			74.9	0.435	11.85
ω 30	Oct. 19	20	0.1	2.075	14.73
			15.0	1.936	14.22
			30.0	1.646	13.49
			44.8	1.326	13.26
			59.7	0.844	11.88
			74.2	0.416	10.87
ω 31	Oct. 19	20	0.1	2.080	14.76
			15.0	1.961	14.41
			30.0	1.678	13.76
			44.8	1.274	12.74
			59.7	0.867	12.20
			74.2	0.450	11.74
ω 35	Nov. 11	20	−0.5	2.078	14.75
			74.2	0.482	12.56
ω 36	Nov. 11	20	−0.5	2.067	14.68
			14.5	1.980	14.51
			29.4	1.670	13.60
			44.6	1.253	12.49
			59.3	0.850	11.82
			74.2	0.451	11.76
ω 37	Nov. 11	20	−0.7	2.073	14.72
			14.3	1.957	14.34
			29.3	1.687	13.75
			44.2	1.266	12.54
			59.2	0.877	12.16
			74.0	0.461	11.88
ω 38	Nov. 11	20	−0.7	2.082	14.78
			14.3	1.959	13.35
			29.3	1.677	13.65
			44.2	1.284	12.72
			59.2	0.896	12.42
			74.0	0.485	12.49
ω 39	Nov. 11	20	−0.7	2.086	14.81
			14.3	1.964	14.38
			29.3	1.686	13.72
			44.2	1.292	12.79
			59.2	0.896	12.43
			74.0	0.488	12.56
ω 39½	Dec. 18	20	0.1	2.101	14.92
			15.1	1.975	14.53
			30.1	1.704	13.99

TABLE 5.—MEAN RESULTS FOR EACH PLATE FROM ALL LINES. OBSERVATIONS OF 1906–1907—Continued.

PLATE No.	DATE.	No. OF LINES.	ϕ	$v + v_1$	ξ
	1906		°	km	°
ω 40	Dec. 18	20	0.1	2.097	14.89
			0.1	2.103	14.93
			15.1	1.974	14.51
			15.1	1.977	14.53
			30.1	1.699	13.94
			30.1	1.704	13.98
ω 41	Dec. 18	20	0.1	2.086	14.81
			0.1	2.076	14.74
			15.1	1.957	14.38
			15.1	1.960	14.40
			30.1	1.703	13.97
			30.1	1.690	13.87
ω 46	Dec. 18	20	44.4	1.294	12.86
			44.4	1.294	12.86
			44.4	1.298	12.90
			59.4	0.884	12.33
			59.4	0.892	12.44
			59.4	0.892	12.43
ω 47	Dec. 18	20	35.4	1.537	13.39
			35.4	1.516	13.20
			44.4	1.308	13.00
			51.9	1.090	12.54
			51.9	1.088	12.53
			59.4	0.897	12.50
	1907				
ω 50	Feb. 3	20	7.5	2.011	14.39
			2.3	1.835	14.18
			38.2	1.514	13.68
			54.0	1.014	12.25
			69.5	0.604	12.25
			77.8	0.311	10.44
			77.8	0.333	11.18
ω 55	Feb. 15	20	7.5	2.049	14.67
			22.4	1.847	14.18
			38.3	1.464	13.22
ω 56	Feb. 15	20	7.5	2.012	14.43
			22.4	1.851	14.20
			38.3	1.454	13.16
			54.0	1.040	12.56
			69.5	0.612	12.41
ω 60	Feb. 28	20	6.5	2.043	14.59
			6.5	2.046	14.62
			20.4	1.841	13.94
			28.1	1.679	13.52
			35.0	1.512	13.10
			43.7	1.285	12.62
			50.5	1.091	12.19
ω 61	Feb. 28	16	43.7	1.265	12.42
		18	50.5	1.105	12.33
		18	59.5	0.836	11.69
		17	59.5	0.836	11.69
		18	65.3	0.679	11.53
		17	65.3	0.679	11.53
		18	65.3	0.724	12.30
		18	65.3	0.722	12.27
ω 62	Feb. 28	20	−6.0	2.042	14.57
			7.9	1.997	14.32
			15.6	1.993	14.69
			22.5	1.789	13.75
			30.2	1.655	13.59
			38.1	1.511	13.64
ω 63	Feb. 28	20	7.2	2.056	14.67
			20.6	1.839	13.95
			28.2	1.674	13.48
			35.1	1.535	13.32
			50.7	1.058	11.86
			43.8	1.283	12.63

PLATE No.	DATE.	No. OF LINES.	ϕ	$v + v_1$	ξ
	1907		°	km	°
ω 64	Apr. 7	20	77.5	0.363	11.92
ω 67	Apr. 7	20	77.5	0.371	12.16
ω 78	Apr. 7	20	77.5	0.369	12.10
ω 69	Apr. 7	20	77.5	0.369	12.10
ω 81	Apr. 22	20	67.2	0.656	12.02
			67.2	0.649	11.89
			72.5	0.501	11.83
			72.5	0.497	11.74
			79.5	0.315	12.27
			79.5	0.314	12.24
ω 83	May 10	20	63.5	0.700	11.14
			63.5	0.720	11.45
			74.4	0.465	12.28
			74.4	0.436	11.51
			79.2	0.302	11.44
			79.2	0.300	11.37
ω 85	May 30	20	63.8	0.730	11.74
			63.8	0.722	11.62
			74.8	0.454	12.30
			74.8	0.462	12.52
ω 85	May 30	20	63.8	0.782	12.58
			63.8	0.792	12.75
			74.8	0.474	12.82
			74.8	0.464	12.56
			79.8	0.291	11.67
			79.8	0.289	11.58
ω 86	May 31	20	14.8	1.966	14.44
		19	29.8	1.668	13.65
		20	44.8	1.304	13.04
		20	64.1	0.770	12.52
		20	76.1	0.408	12.06
		20	81.1	0.268	12.28
ω 87	June 22	20	8.1	2.020	14.49
			23.1	1.793	13.84
			38.6	1.411	12.82
			52.1	1.059	12.24
			52.1	1.055	12.20
			59.1	0.869	12.01
ω 88	June 22	20	8.1	2.031	14.56
			23.1	1.780	13.73
			38.6	1.401	12.74
			52.1	1.071	12.38
			52.1	1.071	12.38
			59.1	0.867	12.00
ω 89	June 22	20	8.5	1.986	14.26
			23.5	1.787	13.84
			39.0	1.405	12.84
			52.5	1.079	12.59
			52.5	1.086	12.67
			59.5	0.866	12.11
ω 90	June 23	20	6.8	2.039	14.58
			21.8	1.782	13.63
			37.3	1.437	12.82
			55.5	1.015	12.71
			53.0	1.073	12.66
			64.4	0.732	12.03
ω 91	June 23	20	6.8	2.034	14.55
			21.8	1.804	13.80
			37.3	1.447	12.91
			53.0	1.089	12.84

TABLE 6.—MEAN RESULTS FOR EACH LATITUDE FROM ALL LINES. OBSERVATIONS OF 1906–1907.

Plate No.	ϕ	$v+v_1$	ξ
	°	km	°
ω 8	0.9	2.064	14.65
19	0.1	2.053	14.58
20	0.1	2.065	14.66
21	0.1	2.059	14.62
23	0.0	2.054	14.58
24	0.0	2.065	14.66
25	0.0	2.060	14.62
26	0.0	2.073	14.72
27	0.0	2.065	14.66
30	0.1	2.075	14.73
31	0.1	2.080	14.76
35	0.5	2.078	14.75
36	0.5	2.067	14.68
37	0.7	2.073	14.72
38	0.7	2.082	14.78
39	0.7	2.086	14.81
39½	0.1	2.101	14.92
40	0.1	2.097	14.89
40	0.1	2.103	14.93
41	0.1	2.086	14.81
41	0.1	2.076	14.74
Means	0.2	2.074	14.73

Plate No.	ϕ	$v+v_1$	ξ
ω 3	9.8	2.012	14.49
6	10.7	2.035	14.70
50	7.5	2.011	14.39
55	7.5	2.049	14.67
56	7.5	2.012	14.43
60	6.5	2.043	14.59
60	6.5	2.046	14.62
62	6.0	2.042	14.57
62	7.9	1.997	14.32
63	7.2	2.056	14.67
87	8.1	2.020	14.49
88	8.1	2.031	14.56
89	8.5	1.986	14.26
90	6.8	2.039	14.58
91	6.8	2.034	14.55
Means	7.7	2.028	14.53

Plate No.	ϕ	$v+v_1$	ξ
ω 8	15.4	1.921	14.52
19	15.1	1.944	14.29
20	15.1	1.930	14.19
21	15.1	1.937	14.24
21	16.1	1.938	14.31
23	15.0	1.934	14.22
24	15.0	1.937	14.24
25	15.0	1.960	14.41
26	15.0	1.977	14.52
26	15.0	1.977	14.52
27	15.0	1.954	14.36
30	15.0	1.936	14.22
31	15.0	1.961	14.41
36	14.5	1.980	14.51
37	14.3	1.957	14.34
38	14.3	1.959	14.35
39	14.3	1.964	14.38
39½	15.1	1.975	14.53
40	15.1	1.974	14.51
40	15.1	1.977	14.53
41	15.1	1.957	14.38
41	15.1	1.960	14.40
62	15.6	1.993	14.69
86	14.8	1.966	14.44
Means	15.0	1.957	14.40

Plate No.	ϕ	$v+v_1$	ξ
	°	km	°
ω 3	24.7	1.805	14.11
6	25.7	1.793	14.13
50	23.3	1.835	14.18
55	22.4	1.847	14.18
56	22.4	1.851	14.20
60	20.4	1.841	13.94
62	22.5	1.789	13.75
63	20.6	1.839	13.95
87	23.1	1.793	13.84
88	23.1	1.780	13.73
89	23.5	1.787	13.84
90	21.8	1.782	13.63
91	21.8	1.804	13.80
Means	22.7	1.811	13.94

Plate No.	ϕ	$v+v_1$	ξ
ω 8	30.4	1.702	14.01
19	30.1	1.675	13.74
20	30.1	1.661	13.62
21	30.1	1.665	13.66
23	30.0	1.669	13.68
24	30.0	1.674	13.72
25	30.0	1.663	13.63
26	30.0	1.637	13.41
27	30.0	1.657	13.59
30	30.0	1.646	13.49
31	30.0	1.678	13.76
36	29.4	1.670	13.60
37	29.3	1.687	13.75
38	29.3	1.677	13.65
39	29.3	1.686	13.72
39½	30.1	1.704	13.99
40	30.1	1.699	13.94
40	30.1	1.704	13.98
41	30.1	1.703	13.97
41	30.1	1.690	13.87
60	28.1	1.679	13.52
62	30.2	1.655	13.59
63	28.2	1.674	13.48
86	29.8	1.668	13.65
Means	29.8	1.676	13.71

Plate No.	ϕ	$v+v_1$	ξ
ω 3	39.7	1.419	13.10
3	39.7	1.419	13.10
6	40.6	1.396	13.05
47	35.4	1.537	13.39
47	35.4	1.516	13.20
50	38.2	1.514	13.68
55	38.3	1.464	13.22
56	38.3	1.454	13.16
60	35.0	1.512	13.10
62	38.1	1.511	13.64
63	35.1	1.535	13.32
87	38.6	1.411	12.82
88	38.6	1.401	12.74
89	39.0	1.405	12.84
90	37.3	1.437	12.82
91	37.3	1.447	12.91
Means	37.8	1.461	13.13

Plate No.	ϕ	$v+v_1$	ξ
	°	km	°
ω 8	45.4	1.322	13.36
19	45.1	1.280	12.87
20	45.1	1.268	12.75
21	45.1	1.274	12.81
23	45.0	1.260	12.65
24	45.0	1.272	12.77
25	45.0	1.272	12.77
26	45.0	1.276	12.80
27	45.0	1.270	12.75
30	44.8	1.326	13.26
31	44.8	1.274	12.74
36	44.6	1.253	12.49
37	44.2	1.266	12.54
38	44.2	1.284	12.72
39	44.2	1.292	12.79
46	44.4	1.294	12.86
46	44.4	1.294	12.86
46	44.4	1.298	12.90
47	44.4	1.308	13.00
60	43.7	1.285	12.62
61	43.7	1.265	12.42
63	43.8	1.283	12.63
86	44.8	1.304	13.04
Means	44.6	1.283	12.80

Plate No.	ϕ	$v+v_1$	ξ
ω 3	54.6	1.004	12.31
6	55.6	0.990	12.44
47	51.9	1.090	12.54
47	51.9	1.088	12.53
50	54.0	1.014	12.25
56	54.0	1.040	12.56
60	50.5	1.091	12.19
61	50.5	1.105	12.33
63	50.7	1.058	11.86
87	52.1	1.059	12.24
87	52.1	1.055	12.20
88	52.1	1.071	12.38
88	52.1	1.071	12.38
89	52.5	1.079	12.59
89	52.5	1.086	12.67
90	53.0	1.073	12.66
90	55.5	1.015	12.71
91	53.0	1.089	12.84
Means	52.7	1.060	12.43

Plate No.	ϕ	$v+v_1$	ξ
ω 19	60.1	0.873	12.44
20	60.1	0.867	12.34
21	60.1	0.859	12.24
23	59.0	0.857	11.82
24	60.0	0.872	12.38
25	60.0	0.861	12.22
26	60.0	0.861	12.19
26	60.0	0.861	12.19
27	60.0	0.827	11.74
30	59.7	0.844	11.88
31	59.7	0.867	12.20
36	59.3	0.850	11.82
37	59.2	0.877	12.16
38	59.2	0.896	12.42
39	59.2	0.896	12.43
46	59.4	0.884	12.33
46	59.4	0.892	12.44
46	59.4	0.892	12.43
47	59.4	0.897	12.50
61	59.5	0.836	11.69
61	59.5	0.836	11.69
87	59.1	0.869	12.01
88	59.1	0.867	12.00
89	59.5	0.866	12.11
Means	59.6	0.867	12.15

Plate No.	ϕ	$v+v_1$	ξ
	°	km	°
ω 3	69.5	0.598	12.12
6	70.4	0.589	12.47
50	69.5	0.604	12.25
56	69.5	0.612	12.41
61	65.3	0.679	11.53
61	65.3	0.679	11.53
61	65.3	0.724	12.30
61	65.3	0.722	12.27
81	67.2	0.656	12.02
81	67.2	0.649	11.89
83	63.5	0.700	11.14
83	63.5	0.700	11.14
83	63.5	0.720	11.45
83	63.5	0.720	11.45
85	63.8	0.730	11.74
85	63.8	0.722	11.62
85	63.8	0.782	12.58
85	63.8	0.792	12.75
86	64.1	0.770	12.52
90	64.4	0.732	12.03
Means	65.6	0.694	11.96

Plate No.	ϕ	$v+v_1$	ξ
ω 8	75.3	0.448	12.53
19	75.1	0.460	12.70
20	75.1	0.423	11.68
21	75.1	0.428	11.81
23	75.0	0.436	11.95
24	75.0	0.439	12.04
25	75.0	0.436	11.98
26	74.9	0.445	12.12
27	74.9	0.435	11.85
30	74.2	0.416	10.87
31	74.2	0.450	11.74
35	74.2	0.482	12.56
36	74.2	0.451	11.76
37	74.0	0.461	11.88
38	74.0	0.485	12.49
39	74.0	0.488	12.56
50	77.8	0.311	10.44
50	77.8	0.333	11.18
64	77.5	0.363	11.92
67	77.5	0.371	12.16
68	77.5	0.369	12.10
69	77.5	0.369	12.10
81	72.5	0.501	11.83
81	72.5	0.497	11.74
83	74.4	0.465	12.28
83	74.4	0.465	12.28
83	74.4	0.436	11.51
83	74.4	0.436	11.51
85	74.8	0.454	12.30
85	74.8	0.462	12.52
85	74.8	0.474	12.82
85	74.8	0.464	12.56
86	76.1	0.408	12.06
Means	75.1	0.435	11.98

Plate No.	ϕ	$v+v_1$	ξ
ω 3	83.6	0.192	12.23
6	84.6	0.177	13.53
81	79.5	0.315	12.27
81	79.5	0.314	12.24
83	79.2	0.302	11.44
83	79.2	0.302	11.44
83	79.2	0.300	11.37
83	79.2	0.300	11.37
85	79.8	0.291	11.67
85	79.8	0.289	11.58
86	81.1	0.268	12.28
Means	80.4	0.277	11.80

TABLE 7.—MEAN RESULTS FOR EACH LINE FROM ALL PLATES. OBSERVATIONS OF 1906–1907.

λ	ELEMENT.	$\phi = 0^\circ.2$			$\phi = 7^\circ.7$			$\phi = 15^\circ.0$			$\phi = 22^\circ.7$		
		NO. OF PLATES.	$v + v_1$	ξ	NO. OF PLATES.	$v + v_1$	ξ	NO. OF PLATES.	$v + v_1$	ξ	NO. OF PLATES.	$v + v_1$	ξ
			km	°		km	°		km	°		km	°
4196.699	*La*	21	2.077	14.75	14	2.022	14.49	24	1.946	14.30	12	1.798	13.84
4197.257	*CN*	21	2.081	14.78	15	2.026	14.51	24	1.957	14.38	13	1.804	13.88
4203.730	*Cr*	21	2.096	14.88	15	2.045	14.65	23	1.974	14.51	13	1.818	13.99
4209.144	*Zr*	21	2.103	14.93	15	2.042	14.63	24	1.977	14.53	13	1.827	14.07
4216.136	*CN*	21	2.057	14.61	15	2.028	14.53	24	1.943	14.28	13	1.799	13.84
4220.509	*Fe*	21	2.089	14.83	15	2.039	14.61	24	1.978	14.54	13	1.824	14.04
4232.887	*Fe*	21	2.089	14.83	15	2.038	14.60	24	1.977	14.53	13	1.824	14.04
4257.815	*Mn*	21	2.090	14.84	15	2.054	14.72	24	1.974	14.51	13	1.832	14.10
4258.477	*Fe*	21	2.074	14.73	15	2.030	14.54	24	1.965	14.45	13	1.810	13.93
4265.418	*Fe*	21	2.075	14.74	15	2.027	14.54	24	1.968	14.46	13	1.805	13.89
4266.081	*Mn*	21	2.080	14.77	15	2.045	14.65	24	1.962	14.42	13	1.830	14.08
4268.915	*Fe*	21	2.072	14.71	15	2.030	14.54	24	1.966	14.45	13	1.814	13.96
4276.836	–*Zr*	21	2.070	14.70	15	2.021	14.48	24	1.954	14.35	13	1.806	13.90
4284.838	*Ni*	21	2.067	14.68	15	2.021	14.48	24	1.958	14.39	13	1.811	13.94
4287.566	*Ti*	21	2.072	14.71	15	2.016	14.44	24	1.956	14.38	13	1.810	13.93
4288.310	*Ti, Fe*	21	2.070	14.70	15	2.016	14.44	24	1.949	14.33	13	1.806	13.90
4290.377	*Ti*	21	2.053	14.58	15	2.003	14.35	24	1.943	14.28	13	1.800	13.85
4290.542	*Fe*	21	2.058	14.62	15	2.016	14.44	24	1.949	14.33	13	1.806	13.90
4291.630	*Fe*	21	2.061	14.63	15	2.010	14.40	24	1.951	14.34	13	1.801	13.86
4294.936	*Zr*	21	2.063	14.65	15	2.018	14.46	24	1.946	14.30	13	1.798	13.84

λ	ELEMENT.	$\phi = 29^\circ.8$			$\phi = 37^\circ.8$			$\phi = 44^\circ.6$			$\phi = 52^\circ.7$		
4196.699	*La*	24	1.660	13.58	15	1.446	12.97	22	1.266	12.62	16	1.034	12.11
4197.257	*CN*	24	1.674	13.70	16	1.445	12.98	22	1.271	12.67	17	1.037	12.15
4203.730	*Cr*	23	1.693	13.84	16	1.467	13.18	22	1.282	12.78	18	1.057	12.38
4209.144	*Zr*	24	1.698	13.89	16	1.469	13.20	23	1.302	12.98	18	1.057	12.38
4216.136	*CN*	24	1.653	13.52	16	1.451	13.04	23	1.266	12.62	18	1.038	12.16
4220.509	*Fe*	24	1.697	13.88	16	1.470	13.21	23	1.296	12.92	18	1.060	12.42
4232.887	*Fe*	24	1.689	13.82	16	1.465	13.16	23	1.287	12.83	18	1.058	12.40
4257.815	*Mn*	24	1.694	13.86	16	1.478	13.28	23	1.301	12.97	18	1.075	12.59
4258.477	*Fe*	24	1.682	13.76	16	1.461	13.13	23	1.289	12.85	18	1.063	12.45
4265.418	*Fe*	24	1.678	13.73	16	1.464	13.16	22	1.286	12.82	18	1.061	12.43
4266.081	*Mn*	24	1.687	13.80	16	1.477	13.27	23	1.295	12.91	18	1.078	12.63
4268.915	*Fe*	24	1.676	13.71	16	1.464	13.16	22	1.286	12.82	18	1.059	12.41
4276.836	–*Zr*	24	1.677	13.72	16	1.464	13.16	23	1.281	12.77	18	1.062	12.44
4284.838	*Ni*	24	1.666	13.63	16	1.459	13.11	23	1.282	12.78	18	1.068	12.51
4287.566	*Ti*	24	1.665	13.62	16	1.459	13.11	22	1.280	12.76	18	1.063	12.45
4288.310	*Ti, Fe*	24	1.670	13.66	16	1.462	13.14	23	1.275	12.71	18	1.067	12.50
4290.377	*Ti*	24	1.661	13.59	16	1.451	13.04	23	1.275	12.71	18	1.060	12.42
4290.542	*Fe*	24	1.669	13.65	16	1.457	13.09	23	1.276	12.72	18	1.065	12.48
4291.630	*Fe*	24	1.667	13.64	16	1.459	13.11	23	1.280	12.76	18	1.065	12.48
4294.936	*Zr*	24	1.666	13.63	16	1.462	13.12	23	1.288	12.84	18	1.068	12.51

λ	ELEMENT.	$\phi = 59^\circ.6$			$\phi = 65^\circ.6$			$\phi = 75^\circ.1$			$\phi = 80^\circ.4$		
4196.699	*La*	22	0.842	11.80	15	0.675	11.65	33	0.407	11.21	11	0.271	11.54
4197.257	*CN*	22	0.848	11.90	16	0.674	11.63	33	0.413	11.41	11	0.269	11.45
4203.730	*Cr*	24	0.871	12.22	20	0.692	11.94	32	0.442	12.20	11	0.283	12.05
4209.144	*Zr*	24	0.877	12.31	20	0.698	12.04	33	0.438	12.09	11	0.280	11.92
4216.136	*CN*	24	0.851	11.94	20	0.673	11.61	33	0.407	11.21	11	0.270	11.49
4220.509	*Fe*	24	0.868	12.17	20	0.693	11.96	33	0.440	12.15	11	0.286	12.18
4232.887	*Fe*	24	0.873	12.25	20	0.698	12.04	33	0.438	12.10	11	0.279	11.88
4257.815	*Mn*	24	0.883	12.39	20	0.710	12.25	33	0.456	12.59	11	0.284	12.09
4258.477	*Fe*	24	0.881	12.36	20	0.698	12.04	33	0.442	12.20	11	0.278	11.83
4265.418	*Fe*	24	0.874	12.26	20	0.694	11.97	33	0.435	12.01	11	0.277	11.79
4266.081	*Mn*	23	0.884	12.40	20	0.707	12.20	33	0.452	12.48	11	0.287	12.22
4268.915	*Fe*	24	0.864	12.12	19	0.703	12.13	33	0.436	12.04	11	0.276	11.75
4276.836	–*Zr*	24	0.869	12.19	20	0.699	12.06	33	0.435	12.01	11	0.276	11.75
4284.838	*Ni*	24	0.864	12.12	20	0.696	12.01	33	0.435	12.01	11	0.276	11.75
4287.566	*Ti*	24	0.874	12.26	20	0.697	12.02	33	0.436	12.04	11	0.279	11.88
4288.310	*Ti, Fe*	24	0.866	12.15	20	0.694	11.97	33	0.437	12.07	11	0.276	11.75
4290.377	*Ti*	24	0.858	12.04	20	0.691	11.93	33	0.431	11.90	11	0.269	11.45
4290.542	*Fe*	24	0.856	12.01	20	0.693	11.96	33	0.437	12.07	11	0.274	11.66
4291.630	*Fe*	24	0.862	12.09	20	0.699	12.06	33	0.448	12.37	11	0.276	11.75
4294.936	*Zr*	24	0.870	12.21	20	0.694	11.96	33	0.434	11.98	11	0.277	11.79

Since a satisfactory discussion of the preceding results involves a comparison with the values obtained during 1908, and the addition of the summaries for the latter at this point would necessarily involve a large amount of repetition and duplication of tables, it has seemed to me preferable to undertake next the detailed consideration of the 1908 observations. When these have been brought to the point at which we now leave the 1906–1907 observations, we shall be able to take up the discussion of the two simultaneously and carry them on to advantage in parallel columns. Accordingly, we now pass to a consideration of the later results.

6. Observations of 1908.

It was not intended at the conclusion of the series of observations made with the Snow telescope during 1906–1907 to undertake an extended continuation of the work for a considerable time. Two circumstances, however, led to a modification of this plan. The first was the completion of the tower telescope and the knowledge we came to have of the decidedly superior advantages possessed by it over the Snow telescope, both as regards astigmatism and changes of focus of the image, and the power and efficiency of the spectroscopic equipment used in connection with it. The second was the discovery of the remarkable differences in the period and law of rotation of the sun which are indicated when we compare results given by the hydrogen lines with those derived from the ordinary lines of the general reversing layer (15). This discovery naturally made it desirable to study certain special lines in the spectrum, and at the same time to continue the study of the rotation period for the reversing layer to act as a check on the other results found. Moreover, such a determination, when compared with the earlier one of 1906–1907, would be of great value in its bearing on the question first raised by Halm, of a variation in the sun's period of rotation. Accordingly, in February, 1908, a new series of observations was begun with the tower telescope.

The essential features of the tower telescope are a cœlostat with a mirror 17 inches (43.2 cm) in diameter, mounted on a track running north and south, and an elliptical second mirror 22.25 × 12.75 inches (56.5 × 32.4 cm) in size, used in connection with it, which sends the beam of light received from the cœlostat upon a 12-inch (30.5 cm) visual objective immediately beneath it. This objective forms the image of the sun on the slit of the spectrograph 60 feet (18.3 m) below, at a distance of 5 feet (1.5 m) above the level of the ground. Two tracks are provided for the cœlostat on the summit of the tower, the instrument being used on the west side for observations during the morning hours, and transferred to the east track in the afternoon. Its position north and south on its track is, of course, defined by the declination of the sun. Two slow motions are provided for controlling the position of the image, the first by means of an electric motor which rotates the cœlostat mirror slowly, and the second by a handle which turns the second plane mirror about a vertical axis. The objective can be focused by the observer from near the end of the spectrograph, by means of a steel tape and hand-wheel, which moves the objective in a vertical direction.

Probably the most distinctive feature of this instrument is the great thickness of the two mirrors employed. This is the same for both mirrors and amounts to 12 inches (30.5 cm), the object being to provide great resistance to flexure when the surfaces are heated by exposure to sunlight. Additional advantages tending to improve the character of the sun's image, which the tower telescope possesses, are the direction of the beam, which is vertical instead of horizontal, and the fact that the path of the beam, due to the formation of the image by a lens, is single instead of double, as would be the case with a concave mirror. A fourth advantage, which is probably of great importance, is that the light falls upon the surface of the cœlostat mirror at an elevation of over 60 feet above the surface of the ground, and so is free from many disturbing effects suffered by light which passes close to the surface of the ground. As a result of these various points of advantage, the character of the image is on the average considerably superior to that formed by the Snow telescope, and the effect of astigmatism and changes of focus is much less marked. As a rule the effect of prolonged exposure to sunlight, at least during the morning hours, is shown by a gradual shortening of the focal length indicating a tendency on the part of the mirrors to become slightly concave (16). This continues to some extent even when the mirrors are covered, and it is probably due to the fact that the edges of the glass become heated from contact with the warm air and expand more

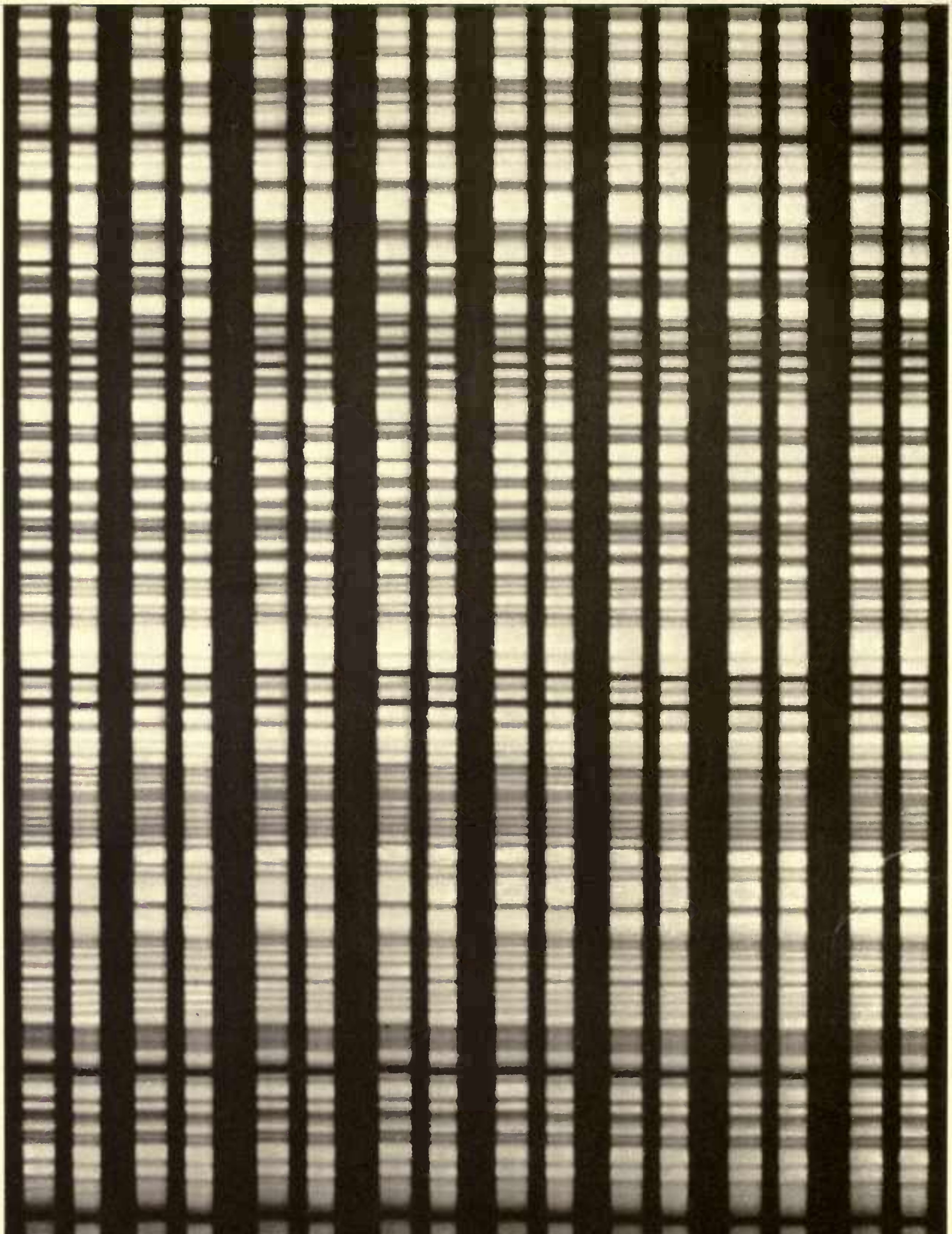
rapidly than the interior of the glass, to which the heat is conducted comparatively slowly. The whole effect is very gradual, however, and hardly appreciable during exposures of half an hour.

The spectrograph employed with the tower telescope is of 30 feet (9.1 m) focal length, and stands in a vertical position in an underground chamber, the walls of which are lined with concrete. The spectrograph is of the auto-collimating type and consists of a skeleton steel tube, at the lower end of which is a heavy casting which carries the lens and the grating mounting. The casting terminates in a rounded head which fits into a cup-shaped support in another casting attached to a small pier on the floor of the pit, and this bearing carries practically the entire weight of the spectrograph. The top of the instrument consists of a large round plate carrying the slit and plate-holder supports. Along the outer edge of this plate there is a circle 30 inches (0.76 m) in diameter, graduated to degrees, and capable of being estimated to within one-tenth of that amount. The entire spectrograph, including this plate, can be rotated about a vertical axis by means of a rack and pinion. In order to define the upper end of the instrument, there is a large stationary ring in which the plate forming the top of the spectrograph fits closely. This carries an index for reading the circle and also serves to support some of the slow-motion handles. The lens and the grating are adjusted by handles near the slit, and the focus of the former is read by a small telescope.

The diagonal-prism arrangement used to bring the images of the opposite edges of the sun upon the slit is considerably more simple than that used in the observations of 1906–1907. This is due to the fact that since the spectrograph rotates as a whole, the attachment itself requires no provision for motion in position angle, but can be clamped directly to the top of the spectrograph. It consists of a small iron casting about 8 inches (20.3 cm) high which is fastened to the spectrograph plate by two taper pins The lower surface of the casting is a few millimeters above the plane of the slit, and to it are attached four small diagonal prisms, two immediately above the slit, and two, at a distance from each other of approximately the sun's diameter, beneath small openings in the casting. The distance between the first pair can be varied to allow for variations in the size of the sun's image, and the light from them is received by the second pair of prisms and reflected upon the slit. Each prism is mounted independently and provided with adjusting screws. The sun's image is centered by means of circles ruled on an aluminium plate fastened to the top of the casting and concentric with the center of the slit. The faces of the prisms can be cleaned without removing them from their mountings.

With this form of mounting it is evident that the danger of changes in the illumination of the grating surface is much less than in cases where the diagonal prisms themselves are movable. I have, however, been careful to maintain the precautions used in the earlier series and have tested the character of the illumination frequently, always before and after the series of exposures, and usually before some of the intermediate exposures. The margin of safety for full illumination of the grating surface is approximately the same for this instrument as for the spectrograph used with the Snow telescope. The ratio of aperture to focal length for the tower telescope is 1 : 60. The grating employed with the spectrograph, which is the same as that used in the earlier series of observations, has a ruled surface 3.25 inches (8.3 cm) long. In the third order the projection of this surface would be less than 3 inches, to fill which would require a ratio of 1 : 120. The factor of safety in this case, accordingly, is about 2.

Since the grating used in this series of observations is the same as that of the earlier series, it has been possible to make a direct comparison of the plates as regards quality and definition. For these photographs the third order has been employed, as against the fourth order previously. With a focal length of spectrograph five-thirds as great, however, there is a gain in linear scale approximately in the ratio of 5 : 4. More exactly, the linear scale of the 1908 plates in the violet is 1 mm = 0.56 Ångström, while for the 1906–1907 observations it is 1 mm = 0.71 Ångström. In spite of this increase in linear scale the lines are decidedly superior on the later plates, a result which is to be attributed in part, no doubt, to the fact that the definition in the third order of this grating is considerably superior to that in the fourth, but probably still more to the excellent conditions of temperature under which the grating is working at the bottom of the deep underground chamber. Experiments have shown that the total variation at the bottom of this pit



λ 4295

λ 4270

φ $-0.5°$ 14.5 29.5 44.5 59.5 74.5 79.5 89.7

Spectra used in the Study of the Reversing Layer. Enlargement about 4.8 times.

corresponding to a daily range inside the spectroscope house of about 15° C. can hardly exceed 0°.06 C. It is scarcely possible that the grating can have worked under conditions approaching this in excellence when in the horizontal spectrograph in the Snow telescope house. The effect of small variations of temperature in the grating during an exposure will eventually be to widen the lines slightly without, in the case of differential determinations of this sort, introducing errors into the displacements, since both spectra are affected alike. The accidental errors of measurement will, however, be somewhat greater for the wider lines, and this is no doubt partly accountable for the gain in the internal agreement of the measures on the later plates.

The procedure followed in taking the plates differs little from that used in the earlier series, and so does not require very extended consideration. The fact that the spectrograph itself is rotated to obtain the position-angle settings for the various latitudes desired has made it possible to secure on all of the plates a position corresponding to the projection of the sun's pole on its visible edge, and this has been used as a most important check on the results for the successive exposures. It constitutes a very marked advantage which the later plates possess over those of the earlier series. The reference line for the observations is obtained by securing the transits of the sun's image across the 30-inch position circle on the top of the spectrograph, the instrument, of course, being brought to the zero position before the exposures are begun. Transits of both edges are taken and the mean value used for the sun's center. Three or four separate observations are usually made for these determinations and the mean taken. As in the observations with the Snow telescope, experiments have shown no appreciable difference in the results obtained when the cœlostat mirror is rotated, or when the clock is stopped and the image allowed to drift across the circle. With a knowledge of the east-and-west line obtained in this way the position of the sun's pole is readily found by reference to a solar ephemeris, and the settings of the position circle corresponding to the latitudes desired are then readily made. In general, about the same heliographic latitudes have been observed during the present series as in the series of 1906–1907. The points at 0°, 15°, 30°, 45°, 60°, and 75° are in fact almost exactly comparable. At intermediate points somewhat different latitudes have been employed, but the normal positions are sufficiently close to each other to make accurate comparisons simple.

TABLE 8. — LINES OBSERVED IN 1908.

λ	ELEMENT.	INTENSITY.	BEHAVIOR AT LIMB.
4196.699	*La*	2	Much weakened.
4197.257	*CN*	2	Slightly weakened.
4203.730	*Cr*	2	Strengthened and widened.
4207.566	*CN*	1 N	Weakened.
4216.136	*CN*	1	Weakened.
4220.509	*Fe*	3	Slightly strengthened and widened.
4232.887	*Fe*	2	Much strengthened and widened.
4233.328	*Mn*	4	Much weakened. Probably not *Mn* but enhanced line of *Fe*.
4257.815	*Mn*	2	Slightly strengthened and widened.
4258.477	*Fe*	2	Much strengthened and widened.
4265.418	*Fe*	2	Slightly weakened.
4266.081	*Mn*	2	Slightly weakened.
4268.915	*Fe*	2	Slightly weakened.
4276.836	-*Zr*	2	Weakened.
4283.169	*Ca*	4	Strengthened and widened.
4284.838	*Ni*	1	Slightly weakened.
4287.566	*Ti*	1	Slightly strengthened and widened.
4288.310	*Ti, Fe*	1	Widened.
4289.525	*Ca*	4	Probably slightly strengthened.
4290.377	*Ti*	2	Slightly weakened. Enhanced line of *Ti*.
4290.542	*Fe*	1	Slightly weakened.

A few modifications have been made in the list of lines used in the earlier investigation, with a view to the inclusion of certain lines of especial interest and the omission of some lines in the previous list which have no particular significance. The revised list consists of the 22 lines given in Table 8.

Of the new lines in the list, λ 4207.566 is included because of its identification in Rowland's table as carbon (more accurately cyanogen). The appearance of the line under high dispersion, however, indicates that it is almost certainly of compound origin, and a similar conclusion is warranted by the size of its displacement at the sun's limb. The line λ 4233.328 is of great interest because of being a very strong spark, or enhanced, line of iron and very prominent in the spectrum of the chromosphere. Two lines of calcium are added to the list for comparison with the so-called "blue line" at λ 4227, as well as with other lines in the less refrangible part of the spectrum investigated by M. Pérot by interference methods (17). Further reference will be made to these results in the course of the discussion.

7. Record of Observations, 1908.

The details of the observations given in Table 9 are taken from the observing journal and cover the 33 plates used in this investigation. The table is essentially the same as that given for the plates of 1906–1907, the principal difference being that in the present series I have measured the diameter of the image and the distance of the slit inside the sun's limb directly, instead of computing them as in the previous case. The columns giving these values are found in the table immediately preceding the column containing the observations for zero. The use of a lens instead of a concave mirror, as in the case of the Snow telescope, has of course involved a correction in focusing the image on the slit of the spectrograph. This is readily found from the shape of the color curve for the lens, and it has been my practice before beginning the observations to focus the image on the slit and then displace the lens by an amount corresponding to this difference for the region under investigation. The other columns in the table are self-explanatory.

Table 9.—Record of Observations, 1908.

Date.	Hour G. M. T.	Plate No.	Definition.	Exposure time.	Slit width.	Distance inside limb.	Diameter of image.	Observations for zero.	Exposure.	Readings position circle.
1908	h m			sec	mm	mm	mm	° °		°
Feb. 16	11 10	ω 103	4	210	0.038	0.5	172.4	142.1 } – { 322.0	1	42.8
								168.3 } – { 348.2	2	27.8
									3	12.8
									4	357.8
									5	342.8
									6	327.8
									7	312.8
Mar. 10	7 0	ω 105	5	180	0.045	3.6	171.6	26.5 } – { 206.9	1	74.6
								52.3 } – { 232.8	2	59.6
									3	44.6
									4	29.6
									5	14.2
									6	358.3
									7	344.6
									8	343.9
									9	357.4
									10	13.0
									11	28.7
Mar. 10	7 50	ω 106	5	150	0.045	3.6	171.6	....	1	43.9
									2	58.9
									4	73.9
									5	58.9
									6	43.9
									7	28.7
									8	13.0
									9	357.4
									10	343.9

TABLE 9.—RECORD OF OBSERVATIONS, 1908—Continued.

Date.	Hour G. M. T.	Plate No.	Definition.	Exposure time.	Slit width.	Distance inside limb.	Diameter of image.	Observations for zero.	Exposure.	Readings position circle.
1908	h m			sec	mm	mm	mm	° °		°
April 8	7 45	ω 113	2–3	180	0.030	3.6	171.6	43.4 } – { 223.5	1	330.1
								69.5 } { 249.4	2	343.1
									3	358.8
									4	15.0
									5	30.1
									6	45.1
									7	60.1
May 26	12 0	ω 117	4	90	0.030	1.6	168.7	297.0 } – { 116.5	1	274.2
								271.2 } { 90.8	2	287.7
									3	303.2
									4	319.0
									5	334.2
									6	349.2
									7	364.2
									8	364.2
									9	349.2
									10	334.2
									11	319.0
									12	303.2
									13	287.7
June 2	3 10	ω 120	4	120	0.033	1.2	168.0	61.6 } – { 242.5	1	312.7
								87.5 } { 268.3	2	326.2
									3	341.7
									4	357.2
									5	12.7
									6	27.7
									7	42.7
									8	40.7
									9	25.7
									10	10.7
									11	355.2
									12	339.7
									13	324.2
									14	310.7
June 9	12 50	ω 128	2	105	0.033	1.5	166.0	269.3 } – { 88.6	1	270.9
								294.7 } { 114.1	2	285.9
								Taken at 10^h 15^m	3	300.9
									4	315.9
									5	330.9
									6	345.9
									7	0.9
June 10	8 15	ω 132	2	90	0.033	1.4	165.6	62.7 } – { 243.0	1	296.6
								88.4 } { 268.6	2	306.6
								Taken at 3^h 0^m	3	321.6
									4	336.6
									5	351.6
									6	6.6
									7	21.6
June 11	3 0	ω 134	4	90	0.033	2.5	168.0	62.9 } – { 243.6	1	295.8
								88.6 } { 269.3	2	305.8
									3	320.8
									4	335.8
									5	350.8
									6	5.8
									7	20.8
									8	25.8
June 11	4 50	ω 135_1	3	75	0.033	2.1	167.4	....	1	295.8
									2	305.8
									3	310.8
									4	325.8
									5	340.8
									6	355.8
									7	10.8
									8	25.8

TABLE 9.—RECORD OF OBSERVATIONS, 1908—Continued.

DATE.	HOUR G. M. T.	PLATE No.	DEFINITION.	EXPOSURE TIME.	SLIT WIDTH.	DISTANCE INSIDE LIMB.	DIAMETER OF IMAGE.	OBSERVATIONS FOR ZERO.	EXPOSURE.	READINGS POSITION CIRCLE.
1908	h m			sec	mm	mm	mm	° °		°
June 11	4 50	135_2	3	75	0.033	2.1	167.4	....	1	25.8
									2	10.8
									3	355.8
									4	340.8
									5	325.8
									6	310.8
									7	305.8
									8	295.8
June 11	5 40	ω 136	2	80	0.032	1.8	167.0	....	1	295.8
									2	305.8
									3	320.8
									4	335.8
									5	350.8
									6	5.8
									7	20.8
									8	25.8
Aug. 5	9 50	ω 146	4	50	0.038	1.3	168.6	277.1 } – { 96.8	1	327.8
								302.7 } – { 122.5	2	342.8
									3	357.8
									4	13.3
									5	28.8
									6	44.3
									7	57.8
Aug. 5	10 30	ω 147	3	70	0.038	1.4	168.6	....	1	57.8
									2	44.3
									3	28.8
									4	13.3
									5	357.8
									6	342.8
									7	327.8
Aug. 5	10 30	ω 148	3	70	0.038	1.4	168.6	....	1	327.8
									2	342.8
									3	357.8
									4	13.3
									5	28.8
									6	44.3
									7	57.8
Aug. 6	5 15	ω 151	3	70	0.038	1.5	168.6	56.2 } – { 236.7	1	278.4
								82.0 } – { 262.4	2	291.9
									3	307.7
									4	323.2
									5	338.4
									6	353.4
									7	8.4
Aug. 26	11 0	ω 161	3	75	0.034	1.1	168.9	105.1 } – { 311.7	1	42.1
								131.1 } – { 285.8	2	17.7
									3	1.7
									4	346.3
									5	331.1
									6	323.6
									7	316.1
Aug. 26	11 0	ω 162	3	75	0.034	1.1	168.9	....	1	316.1
									2	323.6
									3	331.1
									4	346.3
									5	1.7
									6	17.7
									7	42.1

TABLE 9.—RECORD OF OBSERVATIONS, 1908—Continued.

Date.	Hour G. M. T.	Plate No.	Definition.	Exposure time.	Slit width.	Distance inside limb.	Diameter of image.	Observations for zero.	Exposure.	Readings position circle.
1908	h m			sec	mm	mm	mm	° °		°
Aug. 26	11 55	ω 163	3	90	0.034	1.1	168.9	....	1	42.1
									2	17.7
									3	1.7
									4	346.3
									5	331.1
									6	323.6
									7	316.1
Aug. 26	11 55	ω 164	3	90	0.034	1.1	168.9	....	1	316.1
									2	323.6
									3	331.1
									4	346.3
									5	1.7
									6	17.7
									7	42.1
Aug. 27	6 45	ω 165	3	70	0.030	1.6	168.8	46.0 – 253.2	1	280.6
								72.4 – 226.8	2	305.0
									3	320.9
									4	336.4
									5	351.6
									6	359.1
									7	6.6
Aug. 27	6 45	ω 166	3	70	0.030	1.6	168.8	....	1	6.6
									2	359.1
									3	351.6
									4	336.4
									5	320.9
									6	305.0
									7	280.6
Sept. 30	11 40	ω 179	3	90	0.038	1.0	170.6	124.7 – 304.6	5	45.5
								150.8 – 330.7	6	45.5
								Taken at $10^h\ 35^m$		
Sept. 30	11 40	ω 180	3	90	0.038	1.0	170.6	....	3	45.5
									4	45.5
Oct. 9	11 0	ω 182	4	90	0.038	1.0	170.6	130.4 – 310.2	5	314.2
								156.6 – 336.4	6	314.2
									7	299.2
									8	291.2
Oct. 9	11 0	ω 183	4	95	0.038	1.0	170.6	....	1	291.2
									2	299.2
									3	314.2
									4	314.2
									5	299.2
									6	291.2
									7	291.2
									8	299.2
Oct. 22	6 30	ω 184	4	140	0.041	1.3	171.2	195.5 – 15.9	1	305.1
								221.8 – 42.3	2	329.1
									3	334.4
									4	344.8
									5	344.8
									6	334.4
									7	329.1
									8	31.1
Oct. 22	6 30	ω 185	4	140	0.041	1.3	171.2	....	1	31.1
									2	329.1
									4	344.8
									5	344.8
									7	329.1
Oct. 22	7 45	ω 186	3	140	0.041	1.0	171.2	....	1	329.1
									3	344.8
									4	31.1
									5	31.1
									8	329.1

The plates used in this investigation have been measured on the same instruments as those of the earlier series, and accordingly the previous discussion of the screw errors of these comparators is directly applicable in the present work. The process of measurement has also been identical in the two cases as well as the combination of the individual determinations to form the final means. In the present series the inclination of the micrometer wire in the measuring comparator, determined by means of a plate taken with a long slit, is controlled by the exposure secured on the pole of the sun. The conversion of the measured displacements into linear velocity is made by means of Table 10, which is very similar to that given for the earlier observations, and differs from it only because of the difference in the linear scale of the plates. The quantities correspond to the displacements measured with the Toepfer comparator in units of the half-millimeter.

TABLE 10. — CONVERSION OF DISPLACEMENTS INTO VELOCITIES. OBSERVATIONS OF 1908.

λ	One Revolution in Ångströms.	One Ångström in km.	One-half Revolution in km.	λ	One Revolution in Ångströms.	One Ångström in km.	One-half Revolution in km.
4196.699	0.2996	71.45	10.70	4266.081	0.2984	70.29	10.49
4197.257	0.2996	71.44	10.70	4268.915	0.2984	70.24	10.48
4203.730	0.2995	71.33	10.68	4276.836	0.2984	70.11	10.46
4207.566	0.2994	71.27	10.67	4283.169	0.2982	70.01	10.44
4216.136	0.2992	71.12	10.64	4284.838	0.2982	69.98	10.43
4220.509	0.2992	71.05	10.63	4287.566	0.2982	69.94	10.43
4232.887	0.2988	70.84	10.58	4288.310	0.2982	69.92	10.43
4233.328	0.2988	70.83	10.58	4289.525	0.2982	69.90	10.42
4257.815	0.2986	70.43	10.52	4290.377	0.2982	69.89	10.42
4258.477	0.2986	70.42	10.51	4290.542	0.2982	69.89	10.42
4265.418	0.2984	70.30	10.49	4291.630	0.2982	69.87	10.42

It is unnecessary to consider further the various corrections to be applied to the observed linear velocities to reduce them to the sun's sidereal period of rotation, or the computation of the latitudes, since the process of obtaining these is identical with that used in the previous reductions.

Two important respects in which the observations of 1908 have a marked advantage over those in the earlier series have been referred to in the course of the description of the instrument. The first of these is in the quality of the sun's image formed by the object-glass of the telescope, and its comparative freedom from astigmatism and changes of focus during the exposures taken upon the plates. The importance of this source of error was dwelt upon strongly in the previous discussion of this subject, and the probability that it is largely, if not wholly, eliminated in the case of the tower telescope can not fail to be of the greatest possible value to the results obtained. The second advantage is in the relative stability of the diagonal-prism apparatus, which forms the images upon the spectrograph slit, and upon which the illumination of the grating depends. With the precautions taken in the first series of observations considerable changes of illumination could hardly have escaped detection, but sufficiently small changes might have done so, and accordingly it is a source of decided satisfaction that in the present series of determinations the danger of error from this source is also greatly reduced. A third important consideration has already been referred to, but may well be emphasized again. This is the presence on each plate of a spectrum of the edge of the sun corresponding to the projection of the pole. This furnishes a practical check on all of the adjustments of the instrument of the type so much to be desired in the measurement of small displacements.

8. Results for the Individual Plates, 1908.

The results for the individual plates are given in Table 11 in the same form as in Table 4 for the earlier observations, and the symbols employed are the same throughout. The sole difference in the constants of reduction used is that the value of the longitude of the ascending node of the sun's equator Ω, has been modified by a slight correction corresponding to the precession for the two years intervening between the two sets of observations. The value employed is $74^\circ\ 26'$.

Table 11.—Results for Individual Plates. Observations of 1908.

Plate ω 103. 1908, Feb. 16, 11^h 10^m G. M. T. Measured by L. on T. Distance from Limb 0.5 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		0.2				
⊙	326.9	14.8	16.3	73.7	25.4	1.107
⊙−☊	252.4	29.8	30.5	59.5	13.7	1.029
P	17.8	44.8	45.2	44.8	9.8	1.015
D	−6.9	59.8	60.1	29.9	8.0	1.010
Diameter	172.4 mm	74.8	74.9	14.1	7.2	1.008
Factor	1.014	89.8	90.2	−0.2	6.9	1.007

λ	$\phi = -0°.2$				$\phi = 14°.1$				$\phi = 29°.9$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.177	1.935	2.077	14.75	0.165	1.805	1.944	14.23	0.138	1.512	1.636	13.40
4197.257	0.178	1.945	2.087	14.82	0.165	1.805	1.944	14.23	0.138	1.512	1.636	13.40
4203.730	0.176	1.920	2.062	14.64	0.166	1.810	1.949	14.27	0.140	1.531	1.655	13.55
4207.566	0.177	1.928	2.070	14.70	0.168	1.826	1.965	14.38	0.140	1.542	1.666	13.64
4216.136	0.178	1.935	2.077	14.75	0.169	1.838	1.977	14.47	0.139	1.514	1.638	13.41
4220.509	0.180	1.954	2.096	14.88	0.168	1.827	1.966	14.39	0.140	1.541	1.665	13.64
4232.887	0.180	1.946	2.088	14.83	0.170	1.841	1.980	14.49	0.142	1.538	1.662	13.61
4233.328	0.177	1.913	2.055	14.59	0.170	1.840	1.979	14.49	0.140	1.518	1.642	13.45
4257.815	0.183	1.965	2.107	14.96	0.172	1.845	1.984	14.52	0.142	1.528	1.652	13.53
4258.477	0.179	1.922	2.064	14.65	0.171	1.835	1.974	14.45	0.140	1.504	1.628	13.33
4265.418	0.180	1.928	2.070	14.70	0.167	1.787	1.926	14.10	0.140	1.503	1.627	13.32
4266.081	0.182	1.950	2.092	14.85	0.171	1.832	1.971	14.43	0.144	1.546	1.670	13.68
4268.915	0.180	1.926	2.068	14.69	0.168	1.796	1.935	14.16	0.137	1.470	1.594	13.05
4276.836	0.182	1.945	2.087	14.82	0.168	1.795	1.934	14.15	0.142	1.517	1.641	13.44
4283.169	0.178	1.898	2.040	14.48	0.169	1.801	1.940	14.20	0.142	1.517	1.641	13.44
4284.838	0.180	1.920	2.062	14.64	0.171	1.821	1.960	14.35	0.140	1.497	1.621	13.28
4287.566	0.181	1.927	2.069	14.70	0.169	1.800	1.939	14.19	0.142	1.515	1.639	13.42
4288.310	0.182	1.939	2.081	14.78	0.167	1.782	1.921	14.06	0.142	1.515	1.639	13.42
4289.525	0.180	1.917	2.059	14.62	0.166	1.770	1.909	13.97	0.140	1.495	1.619	13.26
4290.377	0.180	1.916	2.058	14.61	0.165	1.760	1.899	13.90	0.138	1.472	1.596	13.07
4290.542	0.180	1.915	2.057	14.60	0.167	1.780	1.919	14.05	0.141	1.504	1.628	13.33
4291.630	0.179	1.905	2.047	14.53	0.170	1.809	1.948	14.26	0.136	1.454	1.578	12.92

λ	$\phi = 44°.8$				$\phi = 59°.5$				$\phi = 73°.7$			
4196.699	0.108	1.189	1.294	12.94	0.060	0.670	0.746	10.44	0.030	0.360	0.402	10.17
4197.257	0.108	1.189	1.294	12.94	0.060	0.670	0.746	10.44	0.032	0.384	0.426	10.78
4203.730	0.109	1.198	1.303	13.03	0.062	0.690	0.766	10.71	0.034	0.407	0.449	11.36
4207.566	0.109	1.191	1.296	12.96	0.062	0.689	0.765	10.70	0.035	0.419	0.461	11.66
4216.136	0.108	1.178	1.283	12.83	0.062	0.689	0.765	10.70	0.034	0.406	0.448	11.33
4220.509	0.108	1.178	1.283	12.83	0.062	0.687	0.763	10.67	0.032	0.382	0.424	10.73
4232.887	0.108	1.176	1.281	12.81	0.064	0.703	0.779	10.90	0.034	0.404	0.446	11.28
4233.328	0.110	1.198	1.303	13.03	0.062	0.684	0.760	10.63	0.032	0.380	0.422	10.67
4257.815	0.112	1.192	1.297	12.97	0.066	0.723	0.779	11.18	0.035	0.413	0.455	11.51
4258.477	0.108	1.168	1.273	12.73	0.065	0.713	0.789	11.04	0.032	0.377	0.419	10.60
4265.418	0.111	1.182	1.287	12.87	0.065	0.711	0.787	11.01	0.032	0.377	0.419	10.60
4266.081	0.110	1.183	1.288	12.88	0.064	0.700	0.776	10.85	0.034	0.401	0.443	11.21
4268.915	0.110	1.182	1.287	12.87	0.065	0.709	0.785	10.98	0.034	0.400	0.442	11.18
4276.836	0.111	1.192	1.297	12.97	0.064	0.699	0.775	10.84	0.034	0.400	0.442	11.18
4283.169	0.110	1.181	1.286	12.86	0.066	0.719	0.795	11.12	0.032	0.375	0.417	10.55
4284.838	0.110	1.183	1.288	12.88	0.066	0.718	0.794	11.11	0.035	0.410	0.452	11.43
4287.566	0.112	1.208	1.313	13.13	0.064	0.698	0.774	10.83	0.035	0.410	0.452	11.43
4288.310	0.112	1.208	1.313	13.13	0.066	0.717	0.793	11.09	0.034	0.398	0.440	11.13
4289.525	0.110	1.181	1.286	12.86	0.064	0.697	0.773	10.81	0.036	0.421	0.463	11.71
4290.377	0.108	1.157	1.262	12.62	0.062	0.674	0.750	10.49	0.034	0.398	0.440	11.13
4290.542	0.108	1.158	1.263	12.63	0.065	0.706	0.782	10.94	0.036	0.421	0.463	11.71
4291.630	0.110	1.179	1.284	12.84	0.064	0.696	0.772	10.80	0.034	0.398	0.440	11.13

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 105_1. 1908, March 10, 7^h 0^m G. M. T. Measured by A. on G. Distance from Limb 1.8 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		0.3				
⊙	349.8	14.0	15.7	74.3	27.7	1.129
⊙−☊	275.3	29.9	30.7	59.3	14.2	1.032
P	23.9	45.3	45.8	44.2	10.1	1.016
D	−7.2	60.3	60.6	29.4	8.3	1.011
Diameter	171.6 mm	75.3	75.4	14.6	7.4	1.008
Factor	1.021	90.3	90.3	− 0.3	7.2	1.008

λ	$\phi = -0°.3$				$\phi = 14°.6$				$\phi = 29°.4$				$\phi = 44°.2$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.170	1.880	2.020	14.31	0.170	1.880	2.016	14.79	0.136	1.508	1.631	13.29	0.111	1.237	1.338	13.25
4197.257	0.170	1.880	2.020	14.31	0.168	1.814	1.950	14.31	0.132	1.463	1.586	12.92	0.112	1.248	1.349	13.36
4203.730	0.176	1.942	2.082	14.77	0.168	1.854	1.990	14.60	0.136	1.505	1.628	13.27	0.112	1.245	1.346	13.33
4207.566	0.168	1.852	1.992	14.14	0.170	1.874	2.010	14.74	0.132	1.459	1.582	12.89	0.110	1.221	1.322	13.09
4216.136	0.172	1.890	2.030	14.39	0.168	1.848	1.984	14.55	0.128	1.410	1.533	12.49	0.108	1.197	1.298	12.85
4220.509	0.172	1.889	2.029	14.38	0.168	1.846	1.982	14.53	0.139	1.419	1.642	13.37	0.113	1.239	1.340	13.27
4232.887	0.176	1.924	2.064	14.64	0.172	1.881	2.017	14.80	0.136	1.492	1.615	13.16	0.110	1.212	1.313	13.00
4233.328	0.172	1.881	2.021	14.32	0.168	1.836	1.972	14.47	0.136	1.492	1.615	13.16	0.110	1.212	1.313	13.00
4257.815	0.180	1.955	2.095	14.87	0.172	1.869	2.005	14.71	0.140	1.525	1.648	13.43	0.118	1.292	1.393	13.80
4258.477	0.176	1.912	2.052	14.55	0.172	1.869	2.005	14.71	0.142	1.548	1.671	13.62	0.116	1.271	1.372	13.58
4265.418	0.174	1.886	2.026	14.41	0.172	1.865	2.001	14.68	0.138	1.500	1.623	13.23	0.116	1.268	1.369	13.55
4266.081	0.178	1.930	2.070	14.69	0.168	1.821	1.957	14.36	0.136	1.476	1.599	13.02	0.112	1.223	1.324	13.11
4268.915	0.180	1.949	2.089	14.83	0.174	1.884	2.020	14.82	0.140	1.520	1.643	13.37	0.116	1.266	1.367	13.53
4276.836	0.180	1.945	2.085	14.80	0.172	1.858	1.994	14.63	0.146	1.582	1.705	13.89	0.114	1.241	1.342	13.29
4283.169	0.180	1.941	2.081	14.77	0.172	1.854	1.990	14.60	0.140	1.513	1.636	13.40	0.116	1.260	1.361	13.47
4284.838	0.180	1.941	2.081	14.77	0.172	1.854	1.990	14.60	0.136	1.470	1.593	12.99	0.112	1.217	1.318	13.05
4287.566	0.180	1.940	2.080	14.76	0.168	1.810	1.946	14.28	0.144	1.556	1.679	13.65	0.117	1.270	1.371	13.57
4288.310	0.178	1.917	2.057	14.59	0.172	1.852	1.988	14.58	0.140	1.512	1.635	13.32	0.116	1.259	1.360	13.46
4289.525	0.180	1.939	2.079	14.75	0.172	1.852	1.988	14.58	0.144	1.554	1.677	13.63	0.118	1.280	1.381	13.67
4290.377	0.176	1.894	2.034	14.42	0.172	1.852	1.988	14.58	0.140	1.511	1.634	13.31	0.108	1.172	1.273	12.59
4290.542	0.180	1.938	2.078	14.74	0.174	1.872	2.008	14.73	0.144	1.554	1.677	13.63	0.119	1.291	1.392	13.78
4291.630	0.184	1.960	2.100	14.91	0.170	1.830	1.966	14.43	0.146	1.576	1.699	13.84	0.116	1.259	1.360	13.46

λ	$\phi = 59°.3$				$\phi = 74°.3$				$\phi = -0°.3$*				$\phi = 14°.6$*			
4196.699	0.066	0.749	0.820	11.40	0.029	0.372	0.408	10.70	0.173	1.909	2.049	14.54	0.163	1.800	1.936	14.21
4197.257	0.070	0.794	0.865	12.03	0.029	0.372	0.408	10.70	0.177	1.952	2.092	14.86	0.164	1.809	1.945	14.28
4203.730	0.070	0.790	0.861	11.97	0.031	0.398	0.434	11.39	0.177	1.948	2.088	14.83	0.165	1.816	1.952	14.33
4207.566	0.060	0.745	0.816	11.35	0.027	0.346	0.382	10.02	0.176	1.936	2.076	14.74	0.166	1.825	1.961	14.39
4216.136	0.068	0.765	0.836	11.63	0.028	0.356	0.392	10.28	0.178	1.952	2.092	14.86	0.168	1.843	1.979	14.52
4220.509	0.070	0.787	0.858	11.93	0.033	0.418	0.454	11.91	0.179	1.960	2.100	14.90	0.167	1.829	1.965	14.42
4232.887	0.068	0.763	0.834	11.60	0.031	0.394	0.430	11.28	0.178	1.942	2.082	14.78	0.168	1.832	1.968	14.44
4233.328	0.066	0.741	0.812	11.29	0.028	0.355	0.391	10.26	0.178	1.942	2.082	14.78	0.170	1.854	1.990	14.61
4257.815	0.072	0.802	0.873	12.14	0.032	0.402	0.438	11.49	0.182	1.973	2.113	15.00	0.172	1.863	1.999	14.67
4258.477	0.068	0.758	0.829	11.53	0.028	0.342	0.378	9.92	0.179	1.940	2.080	14.76	0.173	1.874	2.010	14.75
4265.418	0.072	0.800	0.861	11.97	0.032	0.414	0.450	11.81	0.177	1.914	2.054	14.57	0.169	1.827	1.963	14.41
4266.081	0.068	0.756	0.827	11.50	0.032	0.414	0.450	11.81	0.180	1.946	2.086	14.81	0.173	1.869	2.005	14.72
4268.915	0.070	0.778	0.849	11.81	0.035	0.451	0.487	12.78	0.180	1.944	2.084	14.79	0.169	1.823	1.959	14.37
4276.836	0.072	0.798	0.869	12.08	0.032	0.412	0.448	11.75	0.181	1.951	2.091	14.85	0.170	1.832	1.968	14.44
4283.169	0.072	0.796	0.867	12.05	0.030	0.390	0.426	11.18	0.180	1.936	2.076	14.74	0.172	1.849	1.985	14.59
4284.838	0.068	0.752	0.823	11.44	0.030	0.390	0.426	11.18	0.179	1.925	2.065	14.65	0.170	1.827	1.963	14.41
4287.566	0.072	0.796	0.867	12.05	0.030	0.390	0.426	11.18	0.180	1.936	2.076	14.74	0.169	1.816	1.952	14.33
4288.310	0.070	0.774	0.845	11.75	0.029	0.361	0.397	10.42	0.180	1.935	2.075	14.73	0.170	1.826	1.962	14.40
4289.525	0.070	0.774	0.845	11.75	0.029	0.361	0.397	10.42	0.180	1.934	2.074	14.72	0.171	1.838	1.974	14.48
4290.377	0.072	0.794	0.865	12.03	0.030	0.386	0.422	11.07	0.179	1.922	2.062	14.63	0.172	1.847	1.983	14.55
4290.542	0.072	0.794	0.865	12.03	0.029	0.360	0.396	10.39	0.180	1.932	2.072	14.71	0.172	1.846	1.982	14.54
4291.630	0.070	0.773	0.844	11.74	0.028	0.349	0.385	10.10	0.182	1.953	2.093	14.87	0.171	1.836	1.972	14.47

* Measured by L. on T.

The results for Plate ω 105_1 are continued on page 70.

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 105_2. 1908, March 10, $7^h\ 0^m$ G. M. T. Measured by A. on G. and L. on T.; upper half of table by A., lower by L.
Distance from Limb 1.8 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	349.8	−0.4				
⊙−☊	275.3	59.6	59.9	30.1	8.4	1.011
P	23.9	74.6	74.8	15.2	7.5	1.009
D	−7.2	89.6	90.4	−0.4	7.2	1.008
Diameter	171.6 mm					
Factor	1.021					

λ	$\phi = -0°.4$				$\phi = -0°.4$				$\phi = 15°.2$				$\phi = 30°.1$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.168	1.868	2.008	14.28	0.172	1.913	2.053	14.58	0.164	1.815	1.951	14.35	0.138	1.530	1.653	13.56
4197.257	0.172	1.913	2.053	14.58	0.172	1.903	2.043	14.51	0.166	1.836	1.972	14.51	0.136	1.519	1.642	13.47
4203.730	0.172	1.898	2.038	14.48	0.178	1.963	2.103	14.94	0.168	1.854	1.990	14.64	0.138	1.526	1.649	13.53
4207.566	0.176	1.951	2.091	14.86	0.172	1.907	2.047	14.54	0.166	1.820	1.956	14.39	0.132	1.459	1.582	12.99
4216.136	0.170	1.868	2.008	14.28	0.172	1.902	2.042	14.50	0.162	1.782	1.918	14.10	0.136	1.498	1.621	13.30
4220.509	0.174	1.911	2.051	14.56	0.176	0.944	2.084	14.79	0.168	1.834	1.970	14.49	0.140	1.541	1.664	13.67
4232.887	0.176	1.936	2.076	14.76	0.176	1.924	2.064	14.51	0.168	1.837	1.973	14.51	0.142	1.456	1.579	12.97
4233.328	0.172	1.881	2.021	14.37	0.176	1.914	2.054	14.59	0.168	1.816	1.952	14.36	0.140	1.545	1.668	13.70
4257.815	0.180	1.945	2.085	14.82	0.176	1.923	2.063	14.65	0.166	1.805	1.941	14.27	0.142	1.546	1.669	13.71
4258.477	0.180	1.945	2.085	14.82	0.176	1.945	2.085	14.82	0.172	1.858	1.994	14.67	0.146	1.590	1.713	14.05
4265.418	0.176	1.918	2.058	14.61	0.180	1.908	2.048	14.54	0.168	1.822	1.958	14.40	0.144	1.565	1.688	13.85
4266.081	0.180	1.940	2.080	14.78	0.176	1.940	2.080	14.78	0.168	1.822	1.958	14.40	0.148	1.597	1.720	14.11
4268.915	0.182	1.973	2.113	15.00	0.180	1.971	2.111	14.99	0.166	1.799	1.935	14.23	0.144	1.574	1.697	13.93
4276.836	0.180	1.956	2.096	14.89	0.182	1.935	2.075	14.75	0.170	1.837	1.973	14.51	0.144	1.561	1.684	13.82
4283.169	0.180	1.951	2.091	14.86	0.180	1.941	2.081	14.79	0.168	1.802	1.938	14.25	0.144	1.558	1.681	13.80
4284.838	0.182	1.963	2.103	14.94	0.180	1.941	2.081	14.79	0.160	1.737	1.873	13.79	0.144	1.568	1.691	13.88
4287.566	0.180	1.950	2.090	14.85	0.180	1.929	2.069	14.71	0.168	1.822	1.958	14.40	0.148	1.598	1.721	14.12
4288.310	0.180	1.928	2.068	14.72	0.180	1.938	2.078	14.77	0.168	1.811	1.947	14.32	0.144	1.556	1.679	13.78
4289.525	0.184	1.971	2.111	14.99	0.180	1.948	2.088	14.83	0.172	1.842	1.978	14.55	0.148	1.598	1.721	14.12
4290.377	0.180	1.949	2.089	14.84	0.176	1.884	2.024	14.39	0.168	1.799	1.935	14.23	0.144	1.543	1.666	13.70
4290.542	0.178	1.916	2.056	14.60	0.182	1.958	2.098	14.90	0.170	1.831	1.967	14.47	0.150	1.630	1.753	14.39
4291.630	0.192	1.970	2.110	14.98	0.180	1.937	2.077	14.77	0.168	1.820	1.956	14.39	0.148	1.597	1.720	14.11
	$\phi = -0°.4$				$\phi = -0°.4$				$\phi = 15°.2$				$\phi = 30°.1$			
4196.699	0.173	1.909	2.049	14.55	0.170	1.876	2.016	14.32	0.165	1.821	1.957	14.39	0.138	1.526	1.649	13.53
4197.257	0.176	1.942	2.082	14.78	0.172	1.897	2.037	14.47	0.166	1.831	1.967	14.46	0.140	1.547	1.670	13.72
4203.730	0.175	1.926	2.066	14.68	0.175	1.926	2.066	14.68	0.167	1.825	1.961	14.42	0.141	1.551	1.674	13.76
4207.566	0.176	1.935	2.075	14.74	0.177	1.945	2.085	14.80	0.166	1.821	1.957	14.39	0.141	1.550	1.673	13.75
4216.136	0.174	1.908	2.048	14.54	0.176	1.930	2.070	14.70	0.165	1.811	1.947	14.32	0.138	1.517	1.640	13.44
4220.509	0.178	1.945	2.085	14.80	0.177	1.938	2.078	14.76	0.168	1.835	1.971	14.49	0.141	1.548	1.671	13.73
4232.887	0.179	1.952	2.092	14.86	0.178	1.942	2.082	14.78	0.168	1.833	1.969	14.48	0.143	1.564	1.687	13.87
4233.328	0.178	1.942	2.082	14.78	0.176	1.919	2.059	14.63	0.168	1.833	1.969	14.48	0.140	1.530	1.653	13.56
4257.815	0.180	1.951	2.091	14.84	0.180	1.951	2.091	14.84	0.168	1.821	1.957	14.39	0.141	1.532	1.655	13.58
4258.477	0.181	1.961	2.101	14.92	0.180	1.950	2.090	14.83	0.169	1.832	1.968	14.47	0.143	1.547	1.670	13.72
4265.418	0.179	1.935	2.075	14.74	0.179	1.935	2.075	14.74	0.170	1.833	1.969	14.48	0.143	1.547	1.670	13.72
4266.081	0.180	1.938	2.078	14.76	0.178	1.924	2.064	14.66	0.168	1.817	1.953	14.36	0.143	1.547	1.670	13.72
4268.915	0.180	1.937	2.077	14.75	0.180	1.943	2.083	14.78	0.170	1.831	1.967	14.46	0.143	1.545	1.668	13.70
4276.836	0.180	1.937	2.077	14.75	0.179	1.929	2.069	14.70	0.170	1.830	1.966	14.45	0.143	1.545	1.668	13.70
4283.169	0.180	1.935	2.075	14.74	0.180	1.935	2.075	14.74	0.170	1.830	1.966	14.45	0.142	1.531	1.654	13.57
4284.838	0.180	1.935	2.075	14.74	0.180	1.935	2.075	14.74	0.170	1.829	1.965	14.45	0.142	1.531	1.654	13.57
4287.566	0.182	1.957	2.097	14.89	0.180	1.934	2.074	14.73	0.172	1.850	1.986	14.60	0.144	1.554	1.677	13.79
4288.310	0.182	1.956	2.096	14.88	0.181	1.943	2.083	14.78	0.170	1.829	1.965	14.45	0.143	1.540	1.663	13.65
4289.525	0.181	1.945	2.085	14.80	0.181	1.944	2.084	14.79	0.171	1.837	1.973	14.51	0.144	1.554	1.677	13.79
4290.377	0.180	1.935	2.075	14.74	0.180	1.931	2.071	14.72	0.170	1.827	1.963	14.43	0.144	1.552	1.675	13.77
4290.542	0.182	1.955	2.095	14.89	0.182	1.955	2.095	14.89	0.172	1.848	1.984	14.59	0.145	1.561	1.684	13.84
4291.630	0.182	1.954	2.094	14.88	0.182	1.954	2.094	14.88	0.172	1.847	1.983	14.58	0.148	1.594	1.717	14.13

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate 105_1—Continued. Measured by L. on T.

λ	$\phi = 29^\circ.4$				$\phi = 44^\circ.2$				$\phi = 59^\circ.3$				$\phi = 74^\circ.3$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.139	1.535	1.658	13.51	0.108	1.201	1.302	12.89	0.066	0.746	0.817	11.36	0.028	0.347	0.383	10.05
4197.257	0.138	1.524	1.647	13.43	0.108	1.201	1.302	12.89	0.068	0.767	0.838	11.65	0.028	0.347	0.383	10.05
4203.730	0.139	1.534	1.657	13.50	0.110	1.219	1.320	13.07	0.067	0.754	0.825	11.47	0.026	0.337	0.373	9.79
4207.566	0.141	1.554	1.677	13.66	0.113	1.253	1.354	13.41	0.067	0.754	0.825	11.47	0.027	0.347	0.383	10.05
4216.136	0.138	1.518	1.641	13.37	0.108	1.194	1.295	12.82	0.068	0.763	0.834	11.59	0.027	0.347	0.383	10.05
4220.509	0.140	1.538	1.661	13.54	0.114	1.259	1.360	13.47	0.069	0.770	0.841	11.68	0.028	0.354	0.390	10.23
4232.887	0.143	1.564	1.687	13.75	0.110	1.209	1.310	12.97	0.068	0.759	0.830	11.54	0.028	0.353	0.389	10.21
4233.328	0.142	1.552	1.675	13.65	0.113	1.242	1.343	13.30	0.067	0.748	0.819	11.39	0.029	0.363	0.399	10.47
4257.815	0.143	1.554	1.677	13.66	0.113	1.235	1.336	13.23	0.070	0.772	0.843	11.71	0.030	0.375	0.411	10.78
4258.477	0.140	1.522	1.645	13.40	0.114	1.244	1.345	13.32	0.070	0.772	0.843	11.71	0.031	0.390	0.426	11.18
4265.418	0.142	1.538	1.661	13.53	0.115	1.253	1.354	13.41	0.070	0.771	0.842	11.70	0.028	0.365	0.401	10.52
4266.081	0.142	1.537	1.660	13.52	0.117	1.274	1.375	13.62	0.068	0.752	0.823	11.44	0.030	0.378	0.414	10.86
4268.915	0.142	1.536	1.659	13.51	0.112	1.218	1.319	13.06	0.070	0.770	0.841	11.68	0.028	0.364	0.400	10.49
4276.836	0.142	1.535	1.658	13.50	0.112	1.217	1.318	13.05	0.070	0.770	0.841	11.68	0.029	0.376	0.412	10.81
4283.169	0.144	1.553	1.676	13.66	0.117	1.268	1.369	13.56	0.070	0.770	0.841	11.68	0.029	0.376	0.412	10.81
4284.838	0.141	1.522	1.645	13.40	0.116	1.260	1.361	13.48	0.072	0.793	0.864	12.02	0.029	0.376	0.412	10.81
4287.566	0.142	1.531	1.654	13.48	0.116	12.59	1.360	13.47	0.072	0.793	0.864	12.02	0.028	0.363	0.399	10.47
4288.310	0.143	1.542	1.665	13.56	0.115	1.247	1.348	13.35	0.070	0.770	0.841	11.68	0.028	0.363	0.399	10.47
4289.525	0.143	1.542	1.665	13.56	0.117	1.266	1.367	13.54	0.071	0.780	0.851	11.83	0.028	0.363	0.399	10.47
4290.377	0.142	1.530	1.653	13.47	0.116	1.256	1.357	13.44	0.070	0.769	0.840	11.67	0.028	0.363	0.399	10.47
4290.542	0.143	1.540	1.663	13.54	0.114	1.234	1.335	13.22	0.073	0.801	0.872	12.13	0.030	0.388	0.424	11.12
4291.630	0.145	1.561	1.684	13.72	0.118	1.286	1.387	13.74	0.071	0.779	0.850	11.82	0.030	0.387	0.423	11.10

Plate ω 106. 1908, March 10, $7^h\ 50^m$ G. M. T. Measured by L. on T. Distance from Limb 1.8 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
$\odot$	349.9	−0.4				
$\odot-\Omega$	275.4	13.1	14.9	75.1	29.3	1.147
P	23.9	28.7	29.6	60.4	14.7	1.034
D	−7.2	44.4	44.9	45.1	10.3	1.016
Diameter	171.6 mm	59.6	59.9	30.1	8.4	1.011
Factor	1.021	74.6	74.8	15.2	7.5	1.009

λ	$\phi = 15^\circ.2$				$\phi = 30^\circ.1$				$\phi = 45^\circ.1$ *				$\phi = 60^\circ.4$ *			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.166	1.833	1.969	14.49	0.137	1.515	1.638	13.44	0.112	1.248	1.347	13.55	0.064	0.737	0.806	11.58
4197.257	0.166	1.832	1.968	14.48	0.139	1.533	1.656	13.59	0.108	1.204	1.303	13.11	0.064	0.727	0.796	11.45
4203.730	0.169	1.860	1.996	14.67	0.140	1.544	1.667	13.68	0.112	1.256	1.355	13.63	0.066	0.747	0.816	11.72
4207.566	0.168	1.848	1.984	14.60	0.140	1.543	1.666	13.67	0.104	1.155	1.254	13.62	0.064	0.713	0.782	11.23
4216.136	0.166	1.822	1.958	14.41	0.138	1.517	1.640	13.46	0.108	1.186	1.285	12.93	0.068	0.755	0.824	11.84
4220.509	0.168	1.837	1.973	14.52	0.141	1.548	1.671	13.71	0.112	1.239	1.338	13.46	0.068	0.754	0.823	11.83
4232.887	0.168	1.835	1.971	14.50	0.141	1.541	1.664	13.65	0.106	1.168	1.267	12.75	0.064	0.707	0.776	11.14
4233.328	0.168	1.834	1.970	14.49	0.140	1.530	1.653	13.57	0.110	1.212	1.311	13.19	0.066	0.740	0.809	11.62
4257.815	0.169	1.835	1.971	14.50	0.143	1.554	1.677	13.75	0.112	1.237	1.336	13.44	0.066	0.725	0.794	11.42
4258.477	0.170	1.843	1.979	14.56	0.142	1.542	1.665	13.66	0.110	1.204	1.303	13.11	0.064	0.702	0.771	11.08
4265.418	0.169	1.828	1.964	14.46	0.141	1.525	1.648	13.52	0.114	1.245	1.344	13.52	0.066	0.734	0.803	11.54
4266.081	0.170	1.836	1.972	14.51	0.142	1.534	1.657	13.60	0.112	1.234	1.333	13.41	0.066	0.734	0.803	11.54
4268.915	0.170	1.835	1.971	14.50	0.143	1.547	1.670	13.70	0.116	1.254	1.353	13.61	0.066	0.733	0.802	11.53
4276.836	0.170	1.834	1.970	14.49	0.141	1.522	1.645	13.50	0.110	1.198	1.298	13.05	0.066	0.722	0.791	11.40
4283.169	0.169	1.820	1.956	14.40	0.142	1.531	1.654	13.57	0.110	1.196	1.295	13.03	0.066	0.730	0.799	11.49
4284.838	0.170	1.830	1.966	14.47	0.141	1.520	1.643	13.48	0.108	1.174	1.273	12.81	0.064	0.707	0.776	11.15
4287.566	0.172	1.850	1.986	14.61	0.143	1.542	1.665	13.66	0.112	1.184	1.283	12.91	0.066	0.720	0.789	11.34
4288.310	0.170	1.830	1.966	14.47	0.142	1.533	1.656	13.59	0.112	1.226	1.325	13.33	0.066	0.730	0.799	11.49
4289.525	0.171	1.840	1.976	14.54	0.143	1.540	1.663	13.64	0.112	1.205	1.304	13.12	0.062	0.685	0.754	10.83
4290.377	0.170	1.828	1.964	14.46	0.142	1.529	1.652	13.56	0.118	1.161	1.260	12.69	0.064	0.695	0.764	11.07
4290.542	0.171	1.839	1.975	14.53	0.142	1.528	1.651	13.55	0.116	1.247	1.346	13.54	0.064	0.705	0.774	11.12
4291.630	0.172	1.848	1.984	14.60	0.144	1.550	1.673	13.72	0.116	1.247	1.346	13.54	0.064	0.705	0.774	11.12

* Measured by A. on G.

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 106—Continued. Measured by L. on T.

λ	$\phi = 75\overset{\circ}{.}1$*				$\phi = 45\overset{\circ}{.}1$				$\phi = 60\overset{\circ}{.}4$				$\phi = 75\overset{\circ}{.}1$			
	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.030	0.377	0.411	11.35	0.108	1.189	1.288	12.96	0.058	0.656	0.725	10.65	0.028	0.351	0.385	10.63
4197.257	0.028	0.366	0.400	11.04	0.108	1.189	1.288	12.96	0.058	0.656	0.725	10.65	0.029	0.361	0.395	10.91
4203.730	0.032	0.400	0.434	11.98	0.108	1.196	1.295	13.03	0.058	0.655	0.724	10.64	0.029	0.361	0.395	10.91
4207.566	0.030	0.376	0.410	11.32	0.108	1.195	1.295	13.02	0.060	0.676	0.745	10.80	0.030	0.369	0.403	11.13
4216.136	0.030	0.375	0.409	11.29	0.109	1.204	1.303	13.11	0.058	0.653	0.722	10.62	0.030	0.369	0.403	11.13
4220.509	0.036	0.437	0.471	13.00	0.108	1.188	1.287	12.95	0.060	0.672	0.741	10.71	0.031	0.380	0.414	11.44
4232.887	0.032	0.414	0.448	12.37	0.108	1.187	1.286	12.94	0.061	0.682	0.751	10.85	0.030	0.368	0.402	11.10
4233.328	0.028	0.335	0.369	10.19	0.109	1.197	1.296	13.04	0.060	0.671	0.741	10.71	0.030	0.368	0.402	11.10
4257.815	0.032	0.392	0.426	11.76	0.110	1.200	1.299	13.07	0.062	0.687	0.756	10.91	0.030	0.366	0.400	11.05
4258.477	0.032	0.392	0.426	11.76	0.110	1.200	1.299	13.07	0.062	0.687	0.756	10.91	0.030	0.366	0.400	11.05
4265.418	0.028	0.360	0.394	10.88	0.108	1.176	1.275	12.83	0.062	0.687	0.756	10.91	0.031	0.376	0.410	11.33
4266.081	0.032	0.393	0.427	11.79	0.112	1.219	1.318	13.26	0.061	0.677	0.746	10.78	0.032	0.386	0.420	11.60
4268.915	0.030	0.370	0.404	11.15	0.109	1.185	1.284	12.92	0.062	0.686	0.755	10.90	0.032	0.386	0.420	11.60
4276.836	0.032	0.380	0.414	11.43	0.108	1.174	1.273	12.81	0.062	0.686	0.755	10.90	0.031	0.375	0.409	11.30
4283.169	0.032	0.379	0.413	11.40	0.110	1.202	1.301	13.09	0.062	0.686	0.755	10.90	0.031	0.375	0.409	11.30
4284.838	0.032	0.379	0.413	11.40	0.109	1.181	1.280	12.95	0.063	0.696	0.765	11.13	0.032	0.386	0.420	11.60
4287.566	0.032	0.379	0.413	11.40	0.110	1.193	1.292	13.00	0.062	0.685	0.754	10.89	0.032	0.386	0.420	11.60
4288.310	0.032	0.379	0.413	11.40	0.110	1.192	1.291	12.99	0.062	0.685	0.754	10.89	0.032	0.385	0.419	11.57
4289.525	0.032	0.402	0.436	12.04	0.110	1.192	1.291	12.99	0.063	0.695	0.764	11.12	0.032	0.385	0.419	11.57
4290.377	0.030	0.368	0.402	11.10	0.110	1.190	1.289	12.97	0.060	0.661	0.730	10.72	0.030	0.364	0.398	10.99
4290.542	0.032	0.368	0.402	11.10	0.112	1.212	1.311	13.19	0.063	0.693	0.762	11.10	0.032	0.384	0.418	11.55
4291.630	0.034	0.389	0.423	11.68	0.112	1.212	1.311	13.19	0.062	0.683	0.752	10.87	0.030	0.363	0.397	10.97

λ	$\phi = 45\overset{\circ}{.}1$				$\phi = 60\overset{\circ}{.}4$				$\phi = 75\overset{\circ}{.}1$			
	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.108	1.201	1.300	13.08	0.062	0.703	0.772	11.09	0.028	0.351	0.385	10.63
4197.257	0.108	1.201	1.300	13.08	0.062	0.703	0.772	11.09	0.030	0.376	0.410	11.33
4203.730	0.108	1.198	1.297	13.05	0.063	0.713	0.782	11.24	0.030	0.373	0.407	11.24
4207.566	0.110	1.219	1.318	13.26	0.063	0.711	0.780	11.21	0.028	0.349	0.383	10.58
4216.136	0.110	1.215	1.314	13.22	0.064	0.720	0.789	11.34	0.028	0.349	0.383	10.58
4220.509	0.109	1.203	1.302	13.10	0.064	0.719	0.788	11.32	0.029	0.359	0.393	10.86
4232.887	0.110	1.209	1.308	13.16	0.065	0.730	0.799	11.48	0.029	0.359	0.393	10.86
4233.328	0.110	1.209	1.308	13.16	0.067	0.750	0.819	11.77	0.030	0.371	0.405	11.19
4257.815	0.111	1.212	1.311	13.19	0.066	0.734	0.803	11.53	0.032	0.393	0.427	11.79
4258.477	0.110	1.201	1.300	13.08	0.066	0.734	0.803	11.53	0.031	0.380	0.414	11.44
4265.418	0.110	1.200	1.299	13.07	0.067	0.743	0.812	11.67	0.029	0.354	0.388	10.72
4266.081	0.110	1.199	1.298	13.06	0.066	0.732	0.801	11.50	0.032	0.392	0.426	11.77
4268.915	0.111	1.207	1.306	13.14	0.066	0.731	0.800	11.48	0.030	0.365	0.399	11.02
4276.836	0.111	1.204	1.303	13.11	0.066	0.730	0.799	11.47	0.032	0.392	0.426	11.77
4283.169	0.110	1.193	1.292	13.00	0.067	0.740	0.809	11.63	0.031	0.379	0.413	11.41
4284.838	0.110	1.194	1.293	13.01	0.066	0.729	0.798	11.46	0.032	0.391	0.425	11.74
4287.566	0.110	1.194	1.293	13.01	0.066	0.729	0.798	11.46	0.032	0.391	0.425	11.74
4288.310	0.112	1.203	1.302	13.10	0.067	0.738	0.807	11.60	0.032	0.391	0.425	11.74
4289.525	0.111	1.203	1.302	13.10	0.067	0.738	0.807	11.60	0.031	0.380	0.414	11.44
4290.377	0.110	1.193	1.292	13.00	0.065	0.717	0.786	11.30	0.030	0.368	0.402	11.11
4290.542	0.112	1.212	1.311	13.19	0.066	0.728	0.797	11.44	0.030	0.368	0.402	11.11
4291.630	0.111	1.201	1.300	13.08	0.068	0.749	0.818	11.76	0.030	0.367	0.401	11.09

* Measured by A. on G.

Table II. — Results for Individual Plates. Observations of 1908 — Continued.

Plate ω 113. 1908, April 8, 7^h 45^m G. M. T. Measured by A. on G. Distance from Limb 1.4 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		0.0				
⊙	18.6	13.0	14.3	75.7	25.0	1.103
⊙−☊	304.1	28.7	29.3	60.7	12.3	1.024
½ P	26.5	44.9	45.2	44.8	8.6	1.011
D	−6.0	60.0	60.2	29.8	6.9	1.007
Diameter	170.7 mm	75.0	75.1	14.9	6.2	1.006
Factor	1.017	90.0	90.0	0.0	6.0	1.006

λ	ϕ = 0°.0				ϕ = 14°.9				ϕ = 29°.8			
	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.176	1.919	2.056	14.60	0.164	1.788	1.923	14.12	0.136	1.487	1.611	13.18
4197.257	0.180	1.973	2.110	14.99	0.166	1.820	1.955	14.37	0.140	1.529	1.653	13.56
4203.730	0.182	1.990	2.127	15.11	0.168	1.837	1.972	14.48	0.144	1.567	1.691	13.84
4207.566	0.180	1.967	2.104	14.95	0.164	1.804	1.939	14.24	0.140	1.532	1.656	13.58
4216.136	0.176	1.918	2.055	14.59	0.164	1.788	1.923	14.12	0.138	1.502	1.626	13.30
4220.509	0.180	1.960	2.097	14.89	0.172	1.862	1.997	14.68	0.144	1.562	1.686	13.81
4232.887	0.184	1.984	2.121	15.06	0.172	1.876	2.011	14.78	0.144	1.572	1.696	13.88
4233.328	0.180	1.951	2.088	14.83	0.166	1.800	1.935	14.21	0.136	1.479	1.603	13.12
4257.815	0.184	1.971	2.108	14.98	0.174	1.863	1.998	14.68	0.146	1.566	1.690	13.84
4258.477	0.182	1.960	2.097	14.89	0.172	1.842	1.977	14.52	0.146	1.583	1.707	13.97
4265.418	0.184	1.987	2.124	15.09	0.170	1.827	1.962	14.41	0.148	1.588	1.712	14.01
4266.081	0.184	1.977	2.114	15.02	0.172	1.849	1.984	14.58	0.146	1.573	1.697	13.89
4268.915	0.084	1.975	2.112	15.01	0.172	1.857	1.992	14.63	0.148	1.587	1.711	14.00
4276.836	0.188	2.003	2.140	15.22	0.172	1.854	1.989	14.61	0.148	1.596	1.720	14.07
4283.169	0.184	1.977	2.114	15.02	0.176	1.881	1.202	14.82	0.152	1.627	1.751	14.31
4284.838	0.180	1.934	2.071	14.71	0.176	1.775	1.910	14.03	0.140	1.498	1.622	13.27
4287.566	0.184	1.966	2.103	14.94	0.170	1.816	1.951	14.33	0.144	1.541	1.665	13.60
4288.310	0.184	1.954	2.091	14.85	0.176	1.879	1.201	14.80	0.148	1.572	1.696	13.88
4289.525	0.184	1.965	2.102	14.93	0.172	1.848	1.983	14.57	0.146	1.562	1.686	13.91
4290.377	0.184	1.953	2.090	14.84	0.168	1.794	1.929	14.17	0.148	1.582	1.706	13.96
4290.542	0.184	1.964	2.101	14.93	0.172	1.836	1.970	14.47	0.144	1.551	1.675	13.72
4291.630	0.182	1.942	2.079	14.76	0.172	1.847	1.982	14.56	0.144	1.551	1.675	13.72

λ	ϕ = 44°.8				ϕ = 60°.7				ϕ = 75°.7			
	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ
4196.699	0.104	1.135	1.239	12.39	0.066	0.736	0.810	11.76	0.028	0.325	0.366	10.54
4197.257	0.108	1.202	1.306	13.06	0.066	0.725	0.799	11.60	0.026	0.314	0.355	10.22
4203.730	0.108	1.176	1.280	12.80	0.068	0.745	0.819	11.89	0.024	0.303	0.344	9.92
4207.566	0.104	1.153	1.257	12.57	0.066	0.723	0.797	11.57	0.024	0.302	0.343	9.88
4216.136	0.106	1.161	1.265	12.65	0.068	0.743	0.817	11.86	0.028	0.323	0.364	10.48
4220.509	0.108	1.193	1.297	12.97	0.066	0.731	0.805	11.70	0.028	0.346	0.387	11.14
4232.887	0.116	1.210	1.314	13.14	0.064	0.706	0.780	11.23	0.028	0.321	0.362	10.42
4233.328	0.108	1.187	1.291	12.91	0.064	0.718	0.792	11.50	0.024	0.300	0.341	9.82
4257.815	0.116	1.245	1.349	13.49	0.066	0.724	0.798	11.59	0.028	0.343	0.384	11.06
4258.477	0.112	1.212	1.316	13.16	0.066	0.724	0.798	11.59	0.028	0.332	0.373	10.74
4265.418	0.108	1.167	1.271	12.71	0.064	0.711	0.785	11.40	0.028	0.321	0.362	10.42
4266.081	0.112	1.220	1.324	13.24	0.064	0.711	0.785	11.40	0.028	0.331	0.372	10.72
4268.915	0.110	1.187	1.291	12.91	0.068	0.742	0.816	11.85	0.030	0.352	0.393	11.31
4276.836	0.112	1.206	1.310	13.10	0.070	0.763	0.837	12.15	0.028	0.320	0.361	10.40
4283.169	0.108	1.161	1.265	12.65	0.068	0.751	0.825	11.98	0.028	0.340	0.381	10.97
4284.838	0.110	1.182	1.286	12.86	0.068	0.751	0.825	11.98	0.028	0.330	0.371	10.68
4287.566	0.116	1.246	1.350	13.50	0.066	0.718	0.792	11.50	0.024	0.286	0.327	9.42
4288.310	0.110	1.182	1.286	12.86	0.068	0.728	0.802	11.65	0.026	0.307	0.348	10.02
4289.525	0.116	1.245	1.349	13.49	0.066	0.706	0.780	11.23	0.028	0.317	0.358	10.31
4290.377	0.112	1.202	1.306	13.06	0.064	0.706	0.780	11.23	0.026	0.296	0.337	9.71
4290.542	0.112	1.212	1.316	13.16	0.066	0.716	0.790	11.37	0.026	0.307	0.348	10.02
4291.630	0.112	1.190	1.294	12.94	0.068	0.728	0.802	11.65	0.024	0.296	0.337	9.71

TABLE II.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 113—Continued. Measured by L. on T.

λ	$\phi = 0^\circ.0$				$\phi = 14^\circ.9$				$\phi = 29^\circ.8$			
	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.175	1.934	2.071	14.70	0.162	1.784	1.919	14.10	0.140	1.533	1.657	13.55
4197.257	0.177	1.935	2.072	14.71	0.166	1.815	1.950	14.33	0.142	1.556	1.680	13.74
4203.730	0.182	1.984	2.121	15.06	0.168	1.834	1.969	14.47	0.144	1.574	1.698	13.89
4207.566	0.179	1.961	2.098	14.89	0.166	1.810	1.945	14.29	0.144	1.572	1.696	13.59
4216.136	0.177	1.924	2.061	14.63	0.168	1.827	1.962	14.41	0.145	1.580	1.704	13.94
4220.509	0.179	1.943	2.080	14.77	0.169	1.835	1.970	14.47	0.145	1.577	1.701	13.92
4232.887	0.180	1.947	2.084	14.79	0.172	1.847	1.982	14.56	0.145	1.571	1.695	13.87
4233.328	0.180	1.945	2.082	14.78	0.168	1.817	1.952	14.34	0.145	1.570	1.694	13.86
4257.815	0.181	1.953	2.090	14.84	0.169	1.825	1.960	14.40	0.146	1.574	1.698	13.89
4258.477	0.181	1.945	2.082	14.78	0.171	1.840	1.975	14.51	0.146	1.571	1.695	13.87
4265.418	0.181	1.939	2.076	14.73	0.171	1.834	1.969	14.47	0.144	1.546	1.670	13.66
4266.081	0.180	1.939	2.076	14.73	0.170	1.825	1.960	14.40	0.145	1.556	1.680	13.74
4268.915	0.180	1.937	2.074	14.72	0.172	1.846	1.981	14.55	0.146	1.566	1.690	13.83
4276.836	0.181	1.925	2.062	14.64	0.171	1.827	1.962	14.41	0.145	1.553	1.677	13.72
4283.169	0.181	1.938	2.075	14.73	0.173	1.848	1.983	14.57	0.144	1.539	1.663	13.61
4284.838	0.183	1.948	2.085	14.80	0.168	1.792	1.927	14.16	0.144	1.537	1.661	13.59
4287.566	0.182	1.940	2.077	14.74	0.171	1.823	1.958	14.38	0.146	1.558	1.682	13.76
4288.310	0.182	1.938	2.075	14.73	0.173	1.843	1.978	14.53	0.145	1.548	1.672	13.68
4289.525	0.184	1.958	2.095	14.87	0.169	1.801	1.936	14.22	0.144	1.537	1.661	13.59
4290.377	0.183	1.947	2.084	14.79	0.169	1.801	1.936	14.22	0.147	1.567	1.691	13.83
4290.542	0.182	1.937	2.074	14.72	0.175	1.860	1.995	14.66	0.148	1.578	1.702	13.92
4291.630	0.183	1.948	2.085	14.80	0.173	1.842	1.977	14.52	0.142	1.514	1.638	13.40

λ	$\phi = 44^\circ.8$				$\phi = 60^\circ.7$				$\phi = 75^\circ.7$			
4196.699	0.106	1.165	1.269	12.69	0.064	0.712	0.786	11.42	0.024	0.288	0.329	9.47
4197.257	0.109	1.198	1.302	13.02	0.063	0.701	0.775	11.25	0.026	0.309	0.350	10.07
4203.730	0.110	1.206	1.310	13.10	0.065	0.721	0.795	11.55	0.027	0.319	0.360	10.36
4207.566	0.109	1.195	1.299	12.99	0.066	0.731	0.805	11.69	0.026	0.307	0.348	10.01
4216.136	0.106	1.159	1.263	12.63	0.064	0.708	0.782	11.36	0.027	0.318	0.359	10.33
4220.509	0.108	1.179	1.283	12.83	0.065	0.717	0.791	11.49	0.026	0.307	0.348	10.01
4232.887	0.110	1.196	1.300	13.00	0.066	0.725	0.799	11.60	0.028	0.332	0.373	10.74
4233.328	0.106	1.153	1.257	12.57	0.067	0.737	0.811	11.78	0.028	0.332	0.373	10.74
4257.815	0.111	1.200	1.304	13.04	0.067	0.732	0.806	11.70	0.028	0.330	0.371	10.68
4258.477	0.111	1.199	1.303	13.03	0.066	0.721	0.795	11.55	0.028	0.330	0.371	10.68
4265.418	0.110	1.188	1.292	12.92	0.065	0.710	0.784	11.39	0.026	0.308	0.349	10.04
4266.081	0.113	1.217	1.321	13.21	0.065	0.709	0.783	11.38	0.026	0.308	0.349	10.04
4268.915	0.112	1.206	1.310	13.10	0.067	0.730	0.804	11.66	0.029	0.339	0.379	10.91
4276.836	0.112	1.204	1.308	13.08	0.066	0.718	0.792	11.50	0.028	0.328	0.369	10.62
4283.169	0.110	1.183	1.287	12.87	0.066	0.717	0.791	11.49	0.028	0.328	0.369	10.62
4284.838	0.110	1.182	1.286	12.86	0.066	0.716	0.790	11.48	0.029	0.339	0.380	10.93
4287.566	0.110	1.180	1.284	12.84	0.067	0.727	0.801	11.63	0.028	0.328	0.369	10.62
4288.310	0.110	1.179	1.283	12.83	0.066	0.717	0.791	11.49	0.029	0.338	0.379	10.91
4289.525	0.112	1.200	1.304	13.04	0.066	0.716	0.790	11.48	0.028	0.328	0.369	10.62
4290.377	0.111	0.188	1.292	12.92	0.065	0.705	0.779	11.32	0.026	0.307	0.348	10.01
4290.542	0.112	1.199	1.303	13.03	0.068	0.735	0.809	11.74	0.028	0.328	0.369	10.62
4291.630	0.112	1.199	1.303	13.03	0.066	0.716	0.790	11.48	0.029	0.338	0.379	10.91

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 117_1. 1908, May 26, 12^h 0^m G. M. T. Measured by L. on T. Distance from Limb 1.6 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		0.6				
⊙	65.3	14.1	14.1	75.9	4.7	1.003
⊙ − ☊	350.1	29.6	29.6	60.4	2.3	1.001
P	17.4	45.4	45.4	44.6	1.6	1.000
D	−1.8	60.6	60.6	29.4	1.4	1.000
Diameter	168.7 mm	75.6	75.6	14.4	1.2	1.000
Factor	1.019	90.6	0.6	−0.6	1.1	1.000

λ	$\phi = -0°.6$				$\phi = 14°.4$				$\phi = 29°.4$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.173	1.887	2.021	14.35	0.159	1.735	1.868	13.69	0.138	1.507	1.632	13.30
4197.257	0.172	1.877	2.011	14.28	0.160	1.745	1.878	13.77	0.138	1.506	1.631	13.30
4203.730	0.176	1.915	2.049	14.55	0.163	1.762	1.895	13.89	0.142	1.545	1.670	13.61
4207.566	0.177	1.924	2.058	14.61	0.161	1.747	1.880	13.78	0.142	1.544	1.669	13.61
4216.136	0.175	1.898	2.032	14.43	0.161	1.745	1.878	13.77	0.139	1.508	1.633	13.31
4220.509	0.178	1.928	2.062	14.64	0.163	1.764	1.897	13.91	0.140	1.517	1.642	13.38
4232.887	0.179	1.930	2.064	14.66	0.164	1.768	1.901	13.94	0.143	1.543	1.668	13.60
4233.328	0.178	1.920	2.054	14.58	0.164	1.767	1.900	13.93	0.141	1.522	1.647	13.43
4257.815	0.182	1.951	2.085	14.80	0.168	1.797	1.930	14.15	0.145	1.554	1.679	13.69
4258.477	0.179	1.918	2.052	14.57	0.165	1.766	1.899	13.92	0.144	1.544	1.669	13.61
4265.418	0.180	1.924	2.058	14.61	0.166	1.767	1.900	13.93	0.143	1.528	1.653	13.47
4266.081	0.181	1.934	2.068	14.68	0.166	1.776	1.909	13.99	0.146	1.560	1.685	13.74
4268.915	0.180	1.920	2.054	14.58	0.166	1.765	1.898	13.91	0.146	1.559	1.684	13.73
4276.836	0.182	1.941	2.075	14.73	0.166	1.765	1.898	13.91	0.143	1.523	1.648	13.43
4283.169	0.178	1.896	2.030	14.41	0.167	1.775	1.908	13.99	0.144	1.532	1.657	13.51
4284.838	0.181	1.924	2.058	14.61	0.166	1.767	1.900	13.93	0.145	1.542	1.667	13.59
4287.566	0.181	1.923	2.057	14.61	0.165	1.743	1.876	13.75	0.144	1.531	1.656	13.50
4288.310	0.182	1.934	2.068	14.68	0.165	1.755	1.888	13.84	0.146	1.552	1.677	13.67
4289.525	0.182	1.933	2.067	14.68	0.165	1.755	1.888	13.84	0.146	1.551	1.676	13.66
4290.377	0.182	1.933	2.067	14.68	0.165	1.754	1.887	13.83	0.146	1.550	1.675	13.65
4290.542	0.182	1.932	2.066	14.67	0.167	1.774	1.907	13.98	0.147	1.561	1.686	13.74
4291.630	0.184	1.954	2.088	14.83	0.166	0.764	1.897	13.90	0.148	1.570	1.695	13.82

λ	$\phi = 44°.6$				$\phi = 60°.4$				$\phi = 75°.9$			
4196.699	0.108	1.178	1.285	12.82	0.068	0.741	0.822	11.82	0.029	0.307	0.355	10.35
4197.257	0.108	1.178	1.285	12.82	0.067	0.731	0.812	11.68	0.028	0.307	0.355	10.35
4203.730	0.108	1.173	1.280	12.77	0.069	0.751	0.832	11.96	0.030	0.329	0.377	10.99
4207.566	0.110	1.194	1.301	12.98	0.073	0.793	0.874	12.57	0.029	0.318	0.366	10.67
4216.136	0.108	1.171	1.278	12.75	0.068	0.738	0.819	11.78	0.029	0.317	0.365	10.64
4220.509	0.110	1.190	1.297	12.94	0.070	0.758	0.839	12.07	0.030	0.327	0.375	10.93
4232.887	0.110	1.186	1.293	12.90	0.070	0.754	0.835	12.01	0.030	0.325	0.373	10.87
4233.328	0.112	1.208	1.315	13.12	0.069	0.744	0.825	11.86	0.029	0.314	0.362	10.55
4257.815	0.112	1.201	1.308	13.04	0.072	0.771	0.852	12.25	0.030	0.322	0.370	10.79
4258.477	0.114	1.221	1.328	13.25	0.070	0.751	0.832	11.96	0.032	0.346	0.394	11.49
4265.418	0.111	1.188	1.295	12.92	0.071	0.758	0.839	12.07	0.031	0.334	0.382	11.14
4266.081	0.112	1.197	1.304	13.01	0.071	0.758	0.839	12.07	0.032	0.344	0.392	11.43
4268.915	0.113	1.206	1.313	13.10	0.070	0.747	0.828	11.91	0.030	0.322	0.370	10.79
4276.836	0.111	1.183	1.290	12.87	0.072	0.768	0.849	12.21	0.030	0.321	0.369	10.76
4283.169	0.112	1.191	1.298	12.95	0.070	0.745	0.826	11.88	0.029	0.310	0.358	10.44
4284.838	0.111	1.180	1.287	12.84	0.070	0.745	0.826	11.88	0.032	0.341	0.389	11.34
4287.566	0.114	1.212	1.319	13.16	0.071	0.755	0.836	12.02	0.030	0.321	0.369	10.76
4288.310	0.113	1.201	1.308	13.04	0.072	0.765	0.846	12.17	0.032	0.341	0.389	11.34
4289.525	0.112	1.191	1.298	12.95	0.071	0.755	0.836	12.02	0.030	0.320	0.368	10.73
4290.377	0.112	1.190	1.297	12.94	0.073	0.776	0.857	12.32	0.030	0.320	0.368	10.73
4290.542	0.114	1.211	1.318	13.15	0.071	0.754	0.835	12.01	0.031	0.330	0.378	11.02
4291.630	0.114	1.211	1.318	13.15	0.072	0.764	0.845	12.15	0.031	0.330	0.378	11.02

TABLE 11. — RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908 — Continued.

Plate ω 117_2. 1908, May 26, 12^h 0^m G. M. T. Measured by L. on T. Distance from Limb 1.6 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		0.6				
☉	65.3	14.1	14.1	75.9	4.7	1.003
☉−☊	350.8	29.6	29.6	60.4	2.3	1.001
P	17.4	45.4	45.4	44.6	1.6	1.000
D	−1.1	60.6	60.6	29.4	1.4	1.000
Diameter	168.7 mm	75.6	75.6	14.4	1.2	1.000
Factor	1.019	90.6	0.6	−0.6	1.1	1.000

λ	$\phi = -0°.6$				$\phi = 14°.4$				$\phi = 29°.4$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.174	1.898	2.032	14.43	0.160	1.745	1.878	13.77	0.138	1.506	1.631	13.30
4197.257	0.173	1.887	2.021	14.36	0.160	1.745	1.878	13.77	0.138	1.506	1.631	13.30
4203.730	0.176	1.915	2.049	14.51	0.162	1.760	1.893	13.88	0.142	1.541	1.666	13.58
4207.566	0.177	1.924	2.058	14.61	0.162	1.758	1.891	13.86	0.141	1.530	1.655	13.49
4216.136	0.175	1.898	2.032	14.43	0.162	1.757	1.890	13.86	0.140	1.519	1.644	13.40
4220.509	0.176	1.907	2.041	14.49	0.162	1.755	1.888	13.84	0.142	1.538	1.663	13.56
4232.887	0.180	1.942	2.076	14.74	0.162	1.748	1.881	13.79	0.143	1.544	1.669	13.61
4233.328	0.178	1.920	2.054	14.58	0.164	1.768	1.901	13.94	0.142	1.532	1.657	13.51
4257.815	0.180	1.929	2.063	14.65	0.165	1.768	1.901	13.94	0.144	1.538	1.663	13.56
4258.477	0.180	1.928	2.062	14.64	0.163	1.747	1.880	13.78	0.144	1.537	1.662	13.55
4265.418	0.180	1.924	2.058	14.61	0.164	1.753	1.886	13.83	0.144	1.536	1.661	13.54
4266.081	0.181	1.934	2.068	14.69	0.166	1.769	1.902	13.94	0.144	1.535	1.660	13.53
4268.915	0.181	1.933	2.067	14.68	0.167	1.783	1.916	14.05	0.145	1.545	1.670	13.61
4276.836	0.181	1.929	2.063	14.65	0.168	1.790	1.923	14.10	0.145	1.544	1.669	13.61
4283.169	0.182	1.936	2.070	14.70	0.166	1.765	1.898	13.91	0.144	1.532	1.657	13.51
4284.838	0.182	1.936	2.070	14.70	0.168	1.786	1.919	14.07	0.143	1.521	1.646	13.42
4287.566	0.180	1.913	2.047	14.54	0.165	1.756	1.889	13.85	0.145	1.543	1.668	13.60
4288.310	0.182	1.935	2.069	14.69	0.167	1.777	1.910	14.00	0.147	1.564	1.689	13.77
4289.525	0.182	1.934	2.068	14.69	0.168	1.786	1.919	14.07	0.146	1.552	1.677	13.67
4290.377	0.182	1.933	2.067	14.68	0.166	1.764	1.897	13.91	0.145	1.541	1.666	13.58
4290.542	0.180	1.922	2.056	14.60	0.168	1.784	1.917	14.05	0.149	1.582	1.707	13.91
4291.630	0.183	1.942	2.076	14.74	0.166	1.764	1.897	13.91	0.148	1.572	1.697	13.83

λ	$\phi = 44°.6$				$\phi = 60°.4$				$\phi = 75°.9$			
4196.699	0.108	1.180	1.287	12.84	0.069	0.753	0.834	11.99	0.029	0.317	0.365	10.64
4197.257	0.108	1.181	1.288	12.85	0.068	0.742	0.823	11.84	0.030	0.327	0.375	10.93
4203.730	0.110	1.193	1.300	12.97	0.070	0.762	0.843	12.12	0.029	0.317	0.365	10.64
4207.566	0.109	1.183	1.290	12.87	0.068	0.739	0.820	11.79	0.031	0.335	0.383	11.16
4216.136	0.108	1.172	1.279	12.76	0.066	0.722	0.803	11.55	0.030	0.325	0.372	10.84
4220.509	0.110	1.190	1.297	12.94	0.069	0.748	0.829	11.92	0.030	0.325	0.372	10.84
4232.887	0.109	1.177	1.284	12.81	0.071	0.767	0.848	12.19	0.031	0.334	0.382	11.13
4233.328	0.110	1.187	1.294	12.91	0.070	0.756	0.837	12.04	0.029	0.314	0.362	10.55
4257.815	0.111	1.189	1.296	12.93	0.074	0.791	0.872	12.54	0.032	0.344	0.392	11.43
4258.477	0.111	1.188	1.295	12.92	0.072	0.770	0.851	12.24	0.032	0.343	0.391	11.39
4265.418	0.110	1.178	1.285	12.82	0.071	0.760	0.841	12.09	0.031	0.333	0.381	11.10
4266.081	0.112	1.194	1.301	12.98	0.072	0.769	0.850	12.22	0.032	0.343	0.391	11.39
4268.915	0.112	1.193	1.300	12.97	0.072	0.768	0.849	12.21	0.032	0.343	0.391	11.39
4276.836	0.112	1.193	1.300	12.97	0.071	0.758	0.839	12.07	0.032	0.342	0.390	11.37
4283.169	0.111	1.181	1.288	12.85	0.072	0.770	0.851	12.24	0.032	0.342	0.390	11.37
4284.838	0.112	1.194	1.301	12.98	0.072	0.769	0.850	12.22	0.032	0.344	0.392	11.43
4287.566	0.112	1.193	1.300	12.97	0.073	0.779	0.860	12.36	0.033	0.354	0.402	11.72
4288.310	0.113	1.203	1.310	13.07	0.073	0.777	0.858	12.33	0.032	0.343	0.391	11.39
4289.525	0.112	1.191	1.298	12.95	0.073	0.777	0.858	12.33	0.033	0.353	0.401	11.69
4290.377	0.114	1.211	1.318	13.15	0.072	0.767	0.848	12.19	0.032	0.343	0.391	11.39
4290.542	0.114	1.211	1.318	13.15	0.073	0.776	0.857	12.32	0.032	0.343	0.391	11.39
4291.630	0.113	1.200	1.307	13.04	0.074	0.786	0.867	12.47	0.033	0.352	0.400	11.66

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 120_1. 1908, June 2, 3^h 10^m G. M. T. Measured by L. on T. Distance from Limb 1.2 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
⊙	71.7	12.7	12.7	77.3	1.6	1.000
⊙−☊	357.2	26.2	26.2	63.8	0.8	1.000
P	15.0	41.7	41.7	48.3	0.5	1.000
D	−0.3	57.2	57.2	32.8	0.4	1.000
Diameter	168.0 mm	72.7	72.7	17.3	0.4	1.000
Factor	1.014	87.7	87.7	2.3	0.4	1.000
		102.7	102.7	−12.7	0.4	1.000

λ	$\phi = -12^\circ.7$				$\phi = 2^\circ.3$				$\phi = 17^\circ.3$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.166	1.802	1.932	14.06	0.175	1.894	2.028	14.41	0.158	1.715	1.846	13.74
4197.257	0.166	1.801	1.931	14.05	0.176	1.904	2.038	14.48	0.158	1.715	1.846	13.74
4203.730	0.166	1.798	1.928	14.03	0.175	1.893	2.027	14.40	0.161	1.739	1.870	13.92
4207.566	0.169	1.825	1.955	14.23	0.175	1.893	2.027	14.40	0.160	1.728	1.859	13.84
4216.136	0.168	1.813	1.943	14.14	0.176	1.899	2.033	14.44	0.160	1.726	1.857	13.82
4220.509	0.170	1.832	1.962	14.28	0.178	1.918	2.052	14.58	0.161	1.735	1.866	13.89
4232.887	0.170	1.825	1.955	14.23	0.180	1.932	2.066	14.67	0.162	1.740	1.871	13.93
4233.328	0.170	1.825	1.955	14.23	0.180	1.931	2.065	14.67	0.164	1.759	1.890	14.07
4257.815	0.173	1.841	1.971	14.34	0.180	1.912	2.046	14.54	0.162	1.724	1.855	13.80
4258.477	0.173	1.841	1.971	14.34	0.182	1.931	2.065	14.67	0.162	1.724	1.855	13.80
4265.418	0.172	1.829	1.959	14.26	0.182	1.930	2.064	14.66	0.163	1.733	1.864	13.88
4266.081	0.173	1.841	1.971	14.34	0.182	1.928	2.062	14.65	0.160	1.701	1.832	13.64
4268.915	0.174	1.850	1.980	14.41	0.180	1.909	2.043	14.51	0.164	1.739	1.870	13.92
4276.836	0.169	1.793	1.923	13.99	0.180	1.908	2.042	14.51	0.165	1.746	1.877	13.97
4283.169	0.173	1.830	1.960	14.26	0.182	1.927	2.061	14.64	0.164	1.736	1.867	13.90
4284.838	0.173	1.830	1.960	14.26	0.182	1.925	2.059	14.63	0.164	1.734	1.865	13.88
4287.566	0.173	1.829	1.959	14.26	0.182	1.925	2.059	14.63	0.164	1.734	1.865	13.88
4288.310	0.174	1.843	1.973	14.36	0.183	1.935	2.069	14.70	0.165	1.743	1.874	13.95
4289.525	0.174	1.841	1.971	14.34	0.182	1.923	2.057	14.62	0.165	1.742	1.873	13.94
4290.377	0.173	1.830	1.960	14.26	0.184	1.943	2.077	14.76	0.164	1.732	1.863	13.87
4290.542	0.176	1.860	1.990	14.48	0.183	1.933	2.067	14.69	0.164	1.732	1.863	13.87
4291.630	0.176	1.860	1.990	14.48	0.182	1.923	2.057	14.62	0.162	1.712	1.843	13.72

λ	$\phi = 32^\circ.8$				$\phi = 48^\circ.3$				$\phi = 63^\circ.8$				$\phi = 77^\circ.3$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.139	1.499	1.618	13.67	0.096	1.042	1.143	12.20	0.051	0.555	0.628	10.10	0.026	0.282	0.327	10.56
4197.257	0.138	1.498	1.617	13.66	0.096	1.042	1.143	12.20	0.053	0.575	0.648	10.42	0.026	0.282	0.327	10.56
4203.730	0.140	1.516	1.635	13.81	0.098	1.061	1.162	12.40	0.052	0.563	0.636	10.23	0.027	0.292	0.337	10.88
4207.566	0.141	1.521	1.640	13.85	0.098	1.061	1.162	12.40	0.052	0.562	0.635	10.21	0.027	0.291	0.336	10.85
4216.136	0.139	1.501	1.620	13.68	0.098	1.057	1.158	12.36	0.052	0.561	0.634	10.20	0.026	0.280	0.325	10.50
4220.509	0.141	1.520	1.639	13.84	0.102	1.099	1.200	12.81	0.053	0.570	0.643	10.34	0.025	0.270	0.315	10.17
4232.887	0.142	1.524	1.643	13.88	0.100	1.073	1.174	12.53	0.053	0.569	0.642	10.33	0.028	0.300	0.345	11.14
4233.328	0.142	1.524	1.643	13.88	0.100	1.073	1.174	12.53	0.053	0.569	0.642	10.33	0.028	0.300	0.345	11.14
4257.815	0.144	1.535	1.654	13.97	0.101	1.075	1.176	12.55	0.053	0.565	0.638	10.26	0.028	0.297	0.342	11.04
4258.477	0.142	1.511	1.630	13.77	0.102	1.085	1.186	12.66	0.052	0.555	0.638	10.26	0.027	0.287	0.332	10.72
4265.418	0.143	1.521	1.640	13.85	0.100	1.064	1.165	12.43	0.054	0.574	0.647	10.41	0.028	0.297	0.342	11.04
4266.081	0.144	1.525	1.644	13.89	0.103	1.095	1.196	12.76	0.054	0.374	0.647	10.41	0.029	0.307	0.352	11.37
4268.915	0.144	1.525	1.644	13.89	0.101	1.073	1.174	12.53	0.055	0.583	0.656	10.55	0.028	0.296	0.341	11.01
4276.836	0.144	1.524	1.643	13.88	0.100	1.061	1.162	12.40	0.053	0.562	0.635	10.21	0.028	0.296	0.341	11.01
4283.169	0.144	1.524	1.643	13.88	0.100	1.059	1.160	12.38	0.054	0.571	0.644	10.36	0.028	0.296	0.341	11.01
4284.838	0.145	1.534	1.653	13.96	0.102	1.080	1.186	12.66	0.054	0.571	0.644	10.36	0.028	0.296	0.341	11.01
4287.566	0.146	1.544	1.663	14.04	0.100	1.058	1.159	12.37	0.054	0.571	0.644	10.36	0.025	0.265	0.310	10.01
4288.310	0.146	1.544	1.663	14.04	0.103	1.089	1.190	12.70	0.053	0.560	0.633	10.18	0.028	0.295	0.340	10.98
4289.525	0.146	1.543	1.662	14.04	0.103	1.089	1.190	12.70	0.053	0.560	0.633	10.18	0.028	0.295	0.340	10.98
4290.377	0.146	1.543	1.662	14.04	0.102	1.078	1.179	12.58	0.053	0.560	0.633	10.18	0.028	0.295	0.340	10.98
4290.542	0.146	1.543	1.662	14.04	0.104	1.099	1.200	12.81	0.055	0.580	0.653	10.50	0.027	0.285	0.330	10.66
4291.630	0.147	1.553	1.672	14.12	0.104	1.099	1.200	12.81	0.053	0.560	0.633	10.18	0.026	0.275	0.320	10.33

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 120_2. 1908, June 2, 3^h 10^m G. M. T. Measured by L. on T. Distance from Limb 1.2 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		10.7	10.7	79.3	1.6	1.000
$\odot$	71.7	24.2	24.2	65.8	0.8	1.000
$\odot-\Omega$	357.2	39.7	39.7	50.3	0.5	1.000
P	15.0	55.2	55.2	34.8	0.4	1.000
D	−0.3	70.7	70.7	19.3	0.4	1.000
Diameter	168.0 mm	85.7	85.7	4.3	0.4	1.000
Factor	1.014	100.7	100.7	−10.7	0.4	1.000

λ	$\phi = -10^\circ.7$				$\phi = 4^\circ.3$				$\phi = 19^\circ.3$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.170	1.844	1.974	14.26	0.175	1.900	2.034	14.48	0.156	1.693	1.824	13.74
4197.257	0.170	1.844	1.974	14.26	0.176	1.910	2.044	14.56	0.156	1.693	1.824	13.74
4203.730	0.172	1.862	1.992	14.39	0.177	1.916	2.050	14.60	0.159	1.722	1.853	13.96
4207.566	0.173	1.872	2.002	14.46	0.176	1.904	2.038	14.51	0.160	1.731	1.862	14.02
4216.136	0.174	1.877	2.007	14.50	0.174	1.878	2.012	14.33	0.157	1.693	1.824	13.74
4220.509	0.176	1.897	2.027	14.64	0.180	1.940	2.074	14.77	0.160	1.719	1.850	13.93
4232.887	0.176	1.888	2.018	14.58	0.178	1.910	2.044	14.56	0.159	1.707	1.838	13.84
4233.328	0.174	1.867	1.997	14.43	0.178	1.910	2.044	14.56	0.160	1.717	1.848	13.92
4257.815	0.177	1.887	2.017	14.57	0.181	1.918	2.052	14.61	0.161	1.708	1.839	13.85
4258.477	0.176	1.876	2.006	14.49	0.180	1.908	2.042	14.54	0.161	1.707	1.838	13.84
4265.418	0.177	1.887	2.017	14.57	0.180	1.904	2.038	14.51	0.160	1.697	1.828	13.77
4266.081	0.177	1.886	2.016	14.56	0.181	1.916	2.050	14.60	0.162	1.716	1.847	13.91
4268.915	0.178	1.896	2.026	14.64	0.180	1.906	2.040	14.53	0.162	1.715	1.846	13.90
4276.836	0.176	1.867	1.997	14.43	0.180	1.905	2.039	14.52	0.160	1.694	1.825	13.75
4283.169	0.178	1.884	2.014	14.55	0.180	1.904	2.038	14.51	0.162	1.715	1.846	13.90
4284.838	0.179	1.894	2.024	14.62	0.181	1.916	2.050	14.60	0.161	1.704	1.835	13.82
4287.566	0.176	1.862	1.992	14.39	0.180	1.904	2.038	14.51	0.162	1.714	1.845	13.90
4288.310	0.179	1.893	2.023	14.62	0.180	1.903	2.037	14.50	0.163	1.724	1.855	13.97
4289.525	0.178	1.882	2.012	14.54	0.180	1.902	2.036	14.50	0.160	1.693	1.824	13.74
4290.377	0.178	1.882	2.012	14.54	0.179	1.892	2.026	14.43	0.161	1.704	1.835	13.82
4290.542	0.179	1.891	2.021	14.60	0.182	1.922	2.056	14.64	0.163	1.724	1.855	13.97
4291.630	0.179	1.891	2.021	14.60	0.180	1.901	2.035	14.49	0.162	1.712	1.843	13.88

λ	$\phi = 34^\circ.8$				$\phi = 50^\circ.3$				$\phi = 65^\circ.8$				$\phi = 79^\circ.3$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.136	1.475	1.594	13.78	0.095	1.030	1.128	12.54	0.057	0.621	0.689	11.93	0.019	0.206	0.245	9.37
4197.257	0.136	1.476	1.595	13.79	0.096	1.039	1.137	12.64	0.058	0.630	0.698	12.09	0.019	0.206	0.245	9.37
4203.730	0.138	1.490	1.609	13.91	0.098	1.062	1.160	12.89	0.058	0.626	0.694	12.02	0.020	0.216	0.255	9.75
4207.566	0.138	1.488	1.607	13.89	0.098	1.061	1.159	12.88	0.058	0.626	0.694	12.02	0.020	0.215	0.254	9.71
4216.136	0.136	1.467	1.586	13.71	0.097	1.044	1.142	12.69	0.058	0.625	0.693	12.00	0.020	0.215	0.254	9.71
4220.509	0.139	1.493	1.612	13.94	0.099	1.065	1.163	12.93	0.058	0.625	0.693	12.00	0.020	0.215	0.254	9.71
4232.887	0.140	1.502	1.621	14.01	0.099	1.063	1.161	12.90	0.058	0.623	0.691	11.97	0.020	0.215	0.254	9.71
4233.328	0.140	1.502	1.621	14.01	0.098	1.052	1.150	12.78	0.056	0.601	0.669	11.59	0.019	0.204	0.243	9.29
4257.815	0.142	1.505	1.624	14.04	0.100	1.067	1.165	12.95	0.060	0.639	0.707	12.24	0.022	0.234	0.273	10.44
4258.477	0.140	1.483	1.602	13.85	0.100	1.066	1.164	12.94	0.060	0.639	0.707	12.24	0.020	0.213	0.252	9.64
4265.418	0.141	1.492	1.611	13.93	0.101	1.071	1.169	12.99	0.059	0.628	0.696	12.05	0.021	0.223	0.262	10.02
4266.081	0.141	1.492	1.611	13.93	0.101	1.071	1.169	12.99	0.060	0.635	0.703	12.18	0.020	0.213	0.252	9.64
4268.915	0.140	1.482	1.601	13.84	0.099	1.053	1.151	12.79	0.060	0.635	0.703	12.18	0.020	0.212	0.251	9.60
4276.836	0.142	1.503	1.622	14.02	0.100	1.059	1.157	12.86	0.060	0.635	0.703	12.18	0.021	0.223	0.262	10.02
4283.169	0.140	1.481	1.600	13.83	0.100	1.059	1.157	12.86	0.057	0.593	0.661	11.45	0.020	0.212	0.251	9.60
4284.838	0.142	1.504	1.623	14.03	0.102	1.079	1.177	13.08	0.059	0.625	0.693	12.00	0.020	0.211	0.250	9.56
4287.566	0.141	1.492	1.611	13.93	0.100	1.058	1.156	12.85	0.060	0.635	0.703	12.18	0.022	0.232	0.271	10.36
4288.310	0.142	1.502	1.621	14.01	0.102	1.078	1.176	13.07	0.059	0.624	0.692	11.98	0.024	0.253	0.292	11.16
4289.525	0.141	1.491	1.610	13.92	0.102	1.078	1.176	13.07	0.059	0.624	0.692	11.98	0.024	0.253	0.292	11.16
4290.377	0.140	1.480	1.599	13.82	0.101	1.067	1.165	12.95	0.058	0.615	0.683	11.83	0.022	0.232	0.271	10.36
4290.542	0.142	1.500	1.619	14.00	0.101	1.067	1.165	12.95	0.059	0.624	0.692	12.98	0.020	0.211	0.250	9.56
4291.630	0.142	1.500	1.619	14.00	0.100	1.057	1.155	12.84	0.062	0.616	0.684	11.85	0.022	0.232	0.271	10.36

TABLE 11. — RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908 — Continued.

Plate ω 128_1. 1908, June 9, 12^h 50^m G. M. T. Measured by L. on T. Distance from Limb 1.5 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		0.5				
⊙	78.7	15.5	15.5	74.5	2.0	1.001
⊙ − ☊	4.2	30.5	30.5	59.5	1.0	1.000
P	12.1	45.5	45.5	44.5	0.7	1.000
D	0.6	60.5	60.5	29.5	0.6	1.000
Diameter	166.0 mm	75.5	75.5	14.5	0.6	1.000
Factor	1.018	90.5	90.5	−0.5	0.6	1.000

λ	$\phi = -0\overset{\circ}{.}5$				$\phi = 14\overset{\circ}{.}5$				$\phi = 29\overset{\circ}{.}5$			
	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.174	1.897	2.031	14.42	0.164	1.787	1.917	14.06	0.143	1.560	1.684	13.74
4197.257	0.174	1.896	2.030	14.41	0.162	1.776	1.906	13.98	0.144	1.569	1.693	13.81
4203.730	0.176	1.914	2.048	14.54	0.164	1.778	1.908	13.99	0.144	1.556	1.680	13.70
4207.566	0.177	1.923	2.057	14.61	0.163	1.768	1.898	13.92	0.145	1.565	1.689	13.76
4216.136	0.175	1.896	2.030	14.41	0.162	1.757	1.887	13.84	0.145	1.565	1.689	13.76
4220.509	0.177	1.910	2.044	14.51	0.165	1.782	1.912	14.02	0.144	1.554	1.678	13.70
4232.887	0.177	1.907	2.041	14.49	0.166	1.787	1.917	14.06	0.145	1.564	1.688	13.78
4233.328	0.178	1.918	2.052	14.57	0.166	1.787	1.917	14.06	0.146	1.573	1.697	13.85
4257.815	0.182	1.949	2.083	14.79	0.168	1.795	1.925	14.12	0.148	1.574	1.698	13.85
4258.477	0.181	1.935	2.069	14.69	0.169	1.808	1.938	14.21	0.146	1.554	1.678	13.70
4265.418	0.180	1.923	2.057	14.61	0.167	1.777	1.907	13.98	0.146	1.553	1.677	13.69
4266.081	0.182	1.943	2.077	14.75	0.168	1.787	1.917	14.06	0.147	1.564	1.688	13.78
4268.915	0.181	1.929	2.063	14.65	0.167	1.779	1.909	14.00	0.146	1.553	1.677	13.69
4276.836	0.181	1.928	2.062	14.64	0.167	1.779	1.909	14.00	0.146	1.552	1.676	13.68
4283.169	0.183	1.945	2.079	14.76	0.170	1.810	1.940	14.23	0.147	1.562	1.686	13.75
4284.838	0.182	1.933	2.067	14.68	0.168	1.784	1.914	14.04	0.146	1.550	1.674	13.67
4287.566	0.180	1.912	2.046	14.50	0.169	1.794	1.924	14.11	0.147	1.560	1.684	13.75
4288.310	0.181	1.923	2.057	14.61	0.169	1.794	1.924	14.11	0.148	1.570	1.694	13.83
4289.525	0.182	1.932	2.066	14.67	0.168	1.783	1.913	14.03	0.148	1.570	1.694	13.83
4290.377	0.181	1.921	2.055	14.59	0.170	1.805	1.935	14.19	0.146	1.549	1.673	13.65
4290.542	0.182	1.931	2.065	14.66	0.169	1.793	1.923	14.10	0.151	1.601	1.725	14.08
4291.630	0.182	1.931	2.065	14.66	0.169	1.793	1.923	14.10	0.149	1.581	1.705	13.91

λ	$\phi = 44\overset{\circ}{.}5$				$\phi = 59\overset{\circ}{.}5$				$\phi = 74\overset{\circ}{.}5$			
4196.699	0.105	1.146	1.252	12.46	0.070	0.763	0.845	11.82	0.030	0.327	0.379	10.07
4197.257	0.106	1.155	1.261	12.55	0.068	0.741	0.823	11.51	0.028	0.306	0.358	9.51
4203.730	0.108	1.171	1.277	12.71	0.070	0.762	0.844	11.81	0.030	0.326	0.378	10.04
4207.566	0.108	1.171	1.277	12.71	0.070	0.760	0.842	11.78	0.030	0.326	0.378	10.04
4216.136	0.106	1.149	1.255	12.49	0.068	0.737	0.819	11.45	0.029	0.314	0.366	9.72
4220.509	0.108	1.166	1.272	12.66	0.070	0.758	0.840	11.75	0.030	0.325	0.377	10.02
4232.887	0.108	1.163	1.269	12.62	0.068	0.733	0.815	11.40	0.031	0.334	0.386	10.25
4233.328	0.107	1.153	1.259	12.53	0.068	0.733	0.815	11.40	0.030	0.323	0.375	9.96
4257.815	0.110	1.171	1.277	12.71	0.072	0.770	0.852	11.92	0.031	0.332	0.384	10.20
4258.477	0.108	1.151	1.257	12.51	0.071	0.760	0.842	11.78	0.032	0.342	0.394	10.47
4265.418	0.108	1.151	1.257	12.51	0.069	0.737	0.819	11.45	0.031	0.331	0.383	10.17
4266.081	0.109	1.161	1.267	12.61	0.072	0.755	0.837	11.71	0.031	0.331	0.383	10.17
4268.915	0.107	1.139	1.245	12.39	0.072	0.755	0.837	11.71	0.030	0.320	0.372	9.88
4276.836	0.108	1.148	1.254	12.48	0.070	0.745	0.827	11.57	0.032	0.340	0.392	10.41
4283.169	0.108	1.148	1.254	12.48	0.070	0.745	0.827	11.57	0.031	0.329	0.381	10.12
4284.838	0.109	1.158	1.264	12.58	0.069	0.736	0.818	11.44	0.030	0.319	0.371	9.86
4287.566	0.107	1.139	1.245	12.39	0.070	0.745	0.827	11.57	0.031	0.329	0.381	10.12
4288.310	0.108	1.148	1.254	12.48	0.072	0.765	0.847	11.85	0.030	0.319	0.371	9.86
4289.525	0.108	1.147	1.253	12.47	0.070	0.745	0.827	11.57	0.031	0.329	0.381	10.12
4290.377	0.108	1.147	1.253	12.47	0.069	0.735	0.817	11.43	0.030	0.319	0.371	9.86
4290.542	0.109	1.156	1.262	12.56	0.070	0.745	0.827	11.57	0.032	0.339	0.391	10.39
4291.630	0.109	1.156	1.262	12.56	0.073	0.775	0.857	11.97	0.034	0.361	0.413	10.97

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 132. 1908, June 10, $8^h\ 15^m$ G .M. T. Measured by L. on T. Distance from Limb, 1.4 mm. Quality, good.

		$p-P$	π	ϕ	η	$\sec\eta$
	°	°	°	°	°	
		0.6				
⊙	79.5	10.6	10.6	79.4	3.4	1.002
⊙−☊	5.0	25.6	25.6	64.4	1.5	1.000
P	11.7	40.6	40.6	49.4	1.0	1.000
D	0.7	55.6	55.6	34.4	0.8	1.000
Diameter	165.6 mm	70.6	70.6	19.4	0.6	1.000
Factor	1.017	85.6	85.6	4.4	0.6	1.000

λ	$\phi = 4^\circ.4$				$\phi = 19^\circ.4$				$\phi = 34^\circ.4$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.172	1.873	2.007	14.29	0.162	1.764	1.895	14.26	0.135	1.469	1.588	13.66
4197.257	0.172	1.873	2.007	14.29	0.161	1.753	1.884	14.18	0.134	1.459	1.578	13.58
4203.730	0.176	1.912	2.046	14.57	0.163	1.766	1.897	14.28	0.138	1.500	1.619	13.93
4207.566	0.174	1.888	2.022	14.40	0.162	1.755	1.886	14.20	0.138	1.497	1.616	13.91
4216.136	0.174	1.883	2.017	14.36	0.161	1.743	1.874	14.10	0.137	1.485	1.604	13.80
4220.509	0.176	1.903	2.037	14.50	0.164	1.773	1.904	14.34	0.137	1.481	1.600	13.77
4232.887	0.178	1.916	2.050	14.60	0.164	1.765	1.896	14.27	0.136	1.465	1.584	13.63
4233.328	0.178	1.916	2.050	14.60	0.164	1.765	1.896	14.27	0.137	1.475	1.594	13.72
4257.815	0.177	1.893	2.027	14.43	0.167	1.785	1.916	14.42	0.138	1.476	1.595	13.73
4258.477	0.179	1.912	2.046	14.57	0.166	1.775	1.906	14.34	0.138	1.473	1.592	13.70
4265.418	0.179	1.910	2.044	14.56	0.166	1.770	1.901	14.31	0.138	1.468	1.587	13.66
4266.081	0.180	1.920	2.054	14.63	0.166	1.770	1.901	14.31	0.140	1.493	1.612	13.87
4268.915	0.180	1.912	2.046	14.57	0.165	1.760	1.891	14.23	0.138	1.467	1.586	13.65
4276.836	0.180	1.912	2.046	14.57	0.167	1.774	1.905	14.35	0.138	1.466	1.585	13.63
4283.169	0.179	1.900	2.034	14.48	0.167	1.773	1.904	14.34	0.139	1.476	1.595	13.73
4284.838	0.178	1.890	2.024	14.41	0.166	1.762	1.893	14.25	0.139	1.475	1.594	13.72
4287.566	0.177	1.878	2.012	14.32	0.167	1.771	1.902	14.32	0.138	1.464	1.583	13.62
4288.310	0.178	1.888	2.022	14.40	0.165	1.750	1.881	14.17	0.139	1.475	1.594	13.72
4289.525	0.180	1.908	2.042	14.55	0.167	1.772	1.903	14.33	0.137	1.453	1.572	13.53
4290.377	0.178	1.887	2.021	14.39	0.167	1.770	1.901	14.31	0.139	1.475	1.594	13.72
4290.542	0.180	1.908	2.042	14.55	0.167	1.770	1.901	14.31	0.142	1.505	1.624	13.98
4291.630	0.177	1.876	2.010	14.31	0.168	1.780	1.911	14.38	0.141	1.495	1.614	13.89

λ	$\phi = 49^\circ.4$				$\phi = 64^\circ.4$				$\phi = 79^\circ.4$			
4196.699	0.097	1.056	1.155	12.60	0.060	0.651	0.723	11.88	0.020	0.218	0.258	9.96
4197.257	0.097	1.056	1.155	12.60	0.058	0.631	0.703	11.56	0.020	0.218	0.258	9.96
4203.730	0.100	1.086	1.185	12.93	0.060	0.651	0.723	11.88	0.020	0.217	0.257	9.92
4207.566	0.098	1.062	1.161	12.67	0.060	0.650	0.722	11.87	0.020	0.217	0.257	9.92
4216.136	0.098	1.061	1.160	12.66	0.060	0.649	0.721	11.84	0.019	0.208	0.248	9.57
4220.509	0.099	1.068	1.167	12.73	0.058	0.627	0.699	11.50	0.020	0.217	0.257	9.92
4232.887	0.100	1.076	1.175	12.82	0.060	0.646	0.718	11.80	0.020	0.216	0.256	9.88
4233.328	0.100	1.076	1.175	12.82	0.060	0.646	0.718	11.80	0.021	0.226	0.266	10.27
4257.815	0.099	1.056	1.155	12.60	0.061	0.652	0.724	11.90	0.022	0.234	0.274	10.57
4258.477	0.099	1.056	1.155	12.60	0.060	0.638	0.710	11.68	0.021	0.224	0.264	10.19
4265.418	0.100	1.063	1.162	12.68	0.060	0.638	0.710	11.68	0.020	0.214	0.254	9.80
4266.081	0.101	1.073	1.172	12.79	0.059	0.630	0.702	11.54	0.022	0.234	0.274	10.57
4268.915	0.101	1.073	1.172	12.79	0.062	0.659	0.731	12.02	0.022	0.234	0.274	10.57
4276.836	0.099	1.054	1.153	12.58	0.060	0.638	0.710	11.68	0.021	0.224	0.264	10.19
4283.169	0.100	1.062	1.181	12.89	0.060	0.638	0.710	11.68	0.021	0.224	0.264	10.19
4284.838	0.102	1.083	1.182	12.90	0.060	0.638	0.710	11.68	0.021	0.224	0.264	10.19
4287.566	0.100	1.061	1.160	12.66	0.060	0.638	0.710	11.68	0.022	0.234	0.274	10.57
4288.310	0.102	1.083	1.182	12.90	0.061	0.648	0.720	11.83	0.021	0.224	0.264	10.19
4289.525	0.103	1.093	1.192	13.00	0.062	0.657	0.729	11.98	0.020	0.214	0.254	9.80
4290.377	0.100	1.060	1.159	12.65	0.060	0.637	0.709	11.66	0.020	0.214	0.254	9.80
4290.542	0.101	1.070	1.169	12.76	0.060	0.637	0.709	11.66	0.021	0.223	0.263	10.15
4291.630	0.102	1.081	1.180	12.88	0.061	0.647	0.719	11.82	0.022	0.233	0.273	10.54

TABLE 11. — RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908 — Continued.

Plate ω 134. 1908, June 11, $3^h\ 0^m$ G. M. T. Measured by L. on T. Distance from Limb 2.5 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		0.5				
☉	80.2	10.5	10.5	79.5	4.0	1.002
☉−☊	5.7	25.5	25.5	64.5	1.7	1.000
P	11.4	40.5	40.5	49.5	1.1	1.000
D	0.8	55.5	55.5	34.5	0.9	1.000
Diameter	168.0 mm	70.5	70.5	19.5	0.7	1.000
Factor	1.031	85.5	85.5	4.5	0.7	1.000
		90.5	90.5	−0.5	0.7	1.000

λ	$\phi = -0°.5$				$\phi = 4°.5$				$\phi = 19°.5$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.171	1.888	2.022	14.36	0.169	1.864	1.998	14.23	0.156	1.721	1.852	13.95
4197.257	0.172	1.897	2.031	14.42	0.169	1.864	1.998	14.23	0.156	1.721	1.852	13.95
4203.730	0.174	1.914	2.048	14.54	0.170	1.870	2.004	14.27	0.157	1.727	1.858	13.99
4207.566	0.173	1.900	2.034	14.45	0.173	1.902	2.036	14.50	0.158	1.737	1.868	14.07
4216.136	0.174	1.907	2.041	14.49	0.169	1.855	1.989	14.16	0.156	1.711	1.842	13.87
4220.509	0.174	1.905	2.039	14.48	0.172	1.883	2.017	14.36	0.160	1.752	1.883	14 18
4232.887	0.176	1.918	2.052	14.57	0.174	1.905	2.039	14.52	0.160	1.745	1.876	14.13
4233.328	0.175	1.908	2.042	14.50	0.174	1.905	2.039	14.52	0.161	1.756	1.887	14.21
4257.815	0.178	1.929	2.063	14.65	0.173	1.875	2.009	14.31	0.161	1.745	1.876	14.13
4258.477	0.177	1.914	2.048	14.54	0.174	1.885	2.019	14.38	0.160	1.735	1.866	14.05
4265.418	0.177	1.912	2.046	14.53	0.175	1.891	2.025	14.42	0.160	1.731	1.862	14.02
4266.081	0.178	1.918	2.052	14.57	0.175	1.891	2.025	14.42	0.160	1.731	1.862	14.02
4268.915	0.178	1.926	2.060	14.63	0.175	1.889	2.023	14.41	0.160	1.730	1.861	14.01
4276.836	0.179	1.916	2.050	14.55	0.174	1.875	2.009	14.31	0.161	1.737	1.868	14.06
4283.169	0.178	1.914	2.048	14.54	0.174	1.871	2.005	14.28	0.158	1.699	1.830	13.78
4284.838	0.180	1.932	2.066	14.67	0.175	1.880	2.014	14.34	0.160	1.721	1.852	13.95
4287.566	0.178	1.912	2.046	14.53	0.175	1.880	2.014	14.34	0.160	1.721	1.852	13.95
4288.310	0.177	1.903	2.037	14.47	0.174	1.870	2.004	14.27	0.159	1.709	1.840	13.86
4289.525	0.177	1.902	2.036	14.46	0.175	1.880	2.014	14.34	0.161	1.731	1.862	14.02
4290.377	0.177	1.902	2.036	14.46	0.171	1.869	2.003	14.26	0.159	1.708	1.839	13.85
4290.542	0.177	1.902	2.036	14.46	0.173	1.858	1.992	14.19	0.162	1.739	1.870	14.08
4291.630	0.176	1.891	2.025	14.38	0.175	1.878	2.012	14.33	0.161	1.728	1.859	14.00

λ	$\phi = 34°.5$				$\phi = 49°.5$				$\phi = 64°.5$				$\phi = 79°.5$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.130	1.435	1.555	13.40	0.096	1.058	1.157	12.65	0.057	0.629	0.701	11.56	0.019	0.210	0.250	9.74
4197.257	0.131	1.445	1.665	13.48	0.096	1.058	1.157	12.65	0.058	0.619	0.691	11.40	0.022	0.242	0.282	10.99
4203.730	0.132	1.453	1.573	13.55	0.096	1.056	1.155	12.63	0.057	0.627	0.699	11.51	0.020	0.220	0.260	10.13
4207.566	0.130	1.430	1.550	13.35	0.097	1.066	1.165	12.74	0.058	0.638	0.710	11.72	0.020	0.220	0.260	10.13
4216.136	0.132	1.446	1.566	13.49	0.097	1.063	1.162	12.70	0.057	0.625	0.697	11.50	0.019	0.209	0.249	9.70
4220.509	0.131	1.435	1.555	13.40	0.100	1.096	1.195	13.06	0.058	0.634	0.706	11.64	0.020	0.219	0.259	10.09
4232.887	0.132	1.440	1.560	13.44	0.098	1.068	1.167	12.76	0.058	0.633	0.705	11.62	0.019	0.208	0.248	9.66
4233.328	0.132	1.440	1.560	13.44	0.098	1.068	1.167	12.76	0.058	0.633	0.705	11.62	0.019	0.208	0.248	9.66
4257.815	0.133	1.443	1.563	13.47	0.100	1.085	1.184	12.94	0.059	0.639	0.711	11.73	0.020	0.217	0.257	10.01
4258.477	0.133	1.441	1.561	13.45	0.099	1.071	1.170	12.80	0.059	0.639	0.711	11.73	0.021	0.227	0.267	10.40
4265.418	0.132	1.428	1.548	13.34	0.099	1.071	1.170	12.80	0.060	0.649	0.721	11.89	0.022	0.237	0.277	10.79
4266.081	0.134	1.448	1.568	13.51	0.098	1.059	1.158	12.66	0.060	0.649	0.721	11.89	0.022	0.237	0.277	10.79
4268.915	0.132	1.425	1.545	13.31	0.098	1.056	1.155	12.63	0.060	0.649	0.721	11.89	0.020	0.216	0.256	9.97
4276.836	0.131	1.412	1.532	13.20	0.100	1.077	1.176	12.85	0.059	0.637	0.709	11.70	0.022	0.237	0.277	10.79
4283.169	0.133	1.431	1.551	13.36	0.098	1.055	1.154	12.62	0.059	0.636	0.708	11.69	0.020	0.216	0.256	9.97
4284.838	0.134	1.443	1.563	13.47	0.098	1.055	1.154	12.62	0.060	0.646	0.718	11.84	0.020	0.215	0.255	9.93
4287.566	0.133	1.430	1.550	13.35	0.100	1.074	1.173	12.82	0.058	0.624	0.696	11.48	0.021	0.226	0.266	10.36
4288.310	0.133	1.430	1.550	13.35	0.098	1.055	1.154	12.62	0.058	0.624	0.696	11.48	0.022	0.236	0.276	10.75
4289.525	0.134	1.440	1.560	13.44	0.100	1.073	1.172	12.81	0.060	0.644	0.716	11.81	0.021	0.226	0.266	10.36
4290.377	0.134	1.439	1.559	13.43	0.098	1.053	1.152	12.60	0.059	0.634	0.706	11.64	0.020	0.215	0.255	9.93
4290.542	0.134	1.439	1.559	13.43	0.098	1.052	1.151	12.59	0.058	0.623	0.695	11.46	0.022	0.236	0.276	10.75
4291.630	0.135	1.449	1.569	13.52	0.101	1.084	1.183	12.93	0.060	0.644	0.716	11.81	0.020	0.215	0.255	9.93

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 135_1. 1908, June 11, 4^h 50^m G. M. T. Measured by L. on T. Distance from Limb 2.1 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		0.5				
⊙	80.2	10.5	10.5	79.5	4.0	1.002
⊙−☊	5.7	15.5	15.5	74.5	2.7	1.001
P	11.4	20.5	30.5	59.5	1.4	1.000
D	0.8	45.5	45.5	44.5	1.0	1.000
Diameter	167.4 mm	60.5	60.5	29.5	0.8	1.000
Factor	1.026	75.5	75.5	14.5	0.7	1.000
		90.5	90.5	−0.5	0.7	1.000

λ	$\phi = -0°.5$				$\phi = 14°.5$				$\phi = 29°.5$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.173	1.899	2.033	14.44	0.162	1.779	1.912	14.02	0.141	1.547	1.672	13.64
4197.257	0.174	1.910	2.044	14.52	0.160	1.756	1.889	13.35	0.140	1.537	1.662	13.56
4203.730	0.174	1.908	2.042	14.50	0.164	1.796	1.929	14.15	0.143	1.565	1.690	13.79
4207.566	0.174	1.904	2.038	14.47	0.164	1.793	1.926	14.12	0.143	1.565	1.690	13.79
4216.136	0.177	1.931	2.065	14.66	0.164	1.790	1.923	14.10	0.141	1.539	1.664	13.57
4220.509	0.176	1.918	2.052	14.57	0.166	1.809	1.942	14.24	0.143	1.554	1.679	13.70
4232.887	0.178	1.933	2.067	14.67	0.164	1.791	1.924	14.11	0.142	1.542	1.667	13.60
4233.328	0.179	1.942	2.076	14.74	0.168	1.824	1.957	14.35	0.142	1.542	1.667	13.60
4257.815	0.180	1.938	2.072	14.71	0.169	1.823	1.956	14.34	0.142	1.540	1.665	13.58
4258.477	0.180	1.936	2.070	14.70	0.170	1.831	1.964	14.40	0.145	1.564	1.689	13.78
4265.418	0.178	1.915	2.049	14.55	0.170	1.829	1.962	14.39	0.142	1.529	1.654	13.49
4266.081	0.182	1.963	2.097	14.90	0.168	1.807	1.940	14.23	0.146	1.570	1.695	13.83
4268.915	0.182	1.953	2.087	14.83	0.170	1.820	1.953	14.32	0.143	1.539	1.664	13.57
4276.836	0.180	1.928	2.062	14.64	0.169	1.809	1.942	14.24	0.144	1.545	1.670	13.62
4283.169	0.182	1.949	2.083	14.79	0.168	1.798	1.931	14.16	0.146	1.562	1.687	13.76
4284.838	0.180	1.926	2.060	14.63	0.170	1.818	1.951	14.31	0.147	1.573	1.698	13.85
4287.566	0.181	1.935	2.069	14.69	0.171	1.829	1.962	14.39	0.144	1.542	1.667	13.60
4288.310	0.180	1.925	2.059	14.62	0.170	1.817	1.950	14.30	0.146	1.561	1.686	13.75
4289.525	0.180	1.924	2.058	14.61	0.170	1.820	1.953	14.32	0.145	1.551	1.676	13.67
4290.377	0.180	1.924	2.058	14.61	0.168	1.797	1.930	14.15	0.144	1.540	1.665	13.58
4290.542	0.180	1.924	2.058	14.61	0.170	1.817	1.950	14.30	0.146	1.553	1.678	13.69
4291.630	0.180	1.923	2.057	14.60	0.169	1.806	1.939	14.22	0.146	1.553	1.678	13.69

λ	$\phi = 44°.5$				$\phi = 59°.5$				$\phi = 74°.5$				$\phi = 79°.5$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.102	1.122	1.228	12.22	0.060	0.667	0.748	10.46	0.029	0.319	0.370	9.83	0.020	0.220	0.260	10.13
4197.257	0.103	1.130	1.236	12.30	0.062	0.681	0.762	10.66	0.028	0.309	0.360	9.56	0.020	0.220	0.260	10.13
4203.730	0.104	1.138	1.244	12.38	0.064	0.700	0.781	10.92	0.030	0.329	0.380	10.10	0.021	0.229	0.269	10.48
4207.566	0.104	1.136	1.242	12.36	0.063	0.690	0.771	10.78	0.029	0.318	0.369	9.80	0.021	0.219	0.259	10.09
4216.136	0.104	1.134	1.240	12.34	0.063	0.690	0.771	10.78	0.030	0.327	0.378	10.05	0.019	0.208	0.248	9.66
4220.509	0.106	1.156	1.262	12.56	0.063	0.688	0.769	10.75	0.031	0.337	0.388	10.31	0.020	0.218	0.258	10.05
4232.887	0.106	1.151	1.257	12.51	0.064	0.695	0.776	10.85	0.030	0.326	0.377	10.02	0.020	0.218	0.258	10.05
4233.328	0.106	1.151	1.257	12.51	0.064	0.695	0.776	10.85	0.030	0.326	0.377	10.02	0.021	0.228	0.268	10.44
4257.815	0.105	1.132	1.238	12.32	0.063	0.679	0.760	10.63	0.032	0.344	0.395	10.49	0.021	0.227	0.267	10.40
4258.477	0.108	1.162	1.268	12.62	0.064	0.689	0.770	10.77	0.030	0.324	0.375	9.97	0.020	0.216	0.256	9.97
4265.418	0.105	1.129	1.235	12.29	0.063	0.678	0.758	10.60	0.032	0.344	0.395	10.49	0.022	0.236	0.276	10.75
4266.081	0.107	1.151	1.257	12.51	0.064	0.687	0.768	10.74	0.030	0.324	0.375	9.97	0.020	0.215	0.255	9.93
4268.915	0.108	1.161	1.267	12.61	0.064	0.687	0.768	10.74	0.032	0.344	0.395	10.49	0.022	0.235	0.275	10.71
4276.836	0.106	1.136	1.242	12.36	0.064	0.687	0.768	10.74	0.031	0.334	0.385	10.23	0.021	0.225	0.265	10.32
4283.169	0.106	1.134	1.240	12.34	0.066	0.707	0.788	11.02	0.030	0.322	0.373	9.91	0.022	0.235	0.275	10.71
4284.838	0.106	1.134	1.240	12.34	0.064	0.687	0.768	10.74	0.032	0.344	0.395	10.49	0.021	0.224	0.264	10.28
4287.566	0.107	1.144	1.250	12.44	0.064	0.687	0.768	10.74	0.031	0.334	0.385	10.23	0.021	0.224	0.264	10.28
4288.310	0.106	1.133	1.239	12.33	0.066	0.707	0.788	11.02	0.032	0.343	0.394	10.46	0.021	0.224	0.264	10.28
4289.525	0.108	1.154	1.260	12.54	0.066	0.707	0.788	11.02	0.030	0.321	0.372	9.88	0.020	0.213	0.253	9.85
4290.377	0.105	1.123	1.229	12.23	0.064	0.687	0.768	10.74	0.030	0.321	0.372	9.88	0.020	0.213	0.253	9.85
4290.542	0.104	1.113	1.219	12.13	0.066	0.705	0.786	10.99	0.032	0.342	0.393	10.43	0.020	0.213	0.253	9.85
4291.630	0.106	1.132	1.238	12.32	0.066	0.705	0.786	10.99	0.030	0.321	0.372	9.88	0.022	0.234	0.274	10.69

TABLE II.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 135_2. 1908, June 11, 4^h 50^m G. M. T. Measured by L. on T. Distance from Limb 1.8 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		0.5				
⊙	80.2	10.5	10.5	79.5	4.0	1.002
⊙−☊	5.7	15.5	15.5	74.5	2.7	1.001
P	11.4	30.5	30.5	59.5	1.4	1.000
D	0.8	45.5	45.5	44.5	1.0	1.000
Diameter	167.4 mm	60.5	60.5	29.5	0.8	1.000
Factor	1.022	75.5	75.5	14.5	0.7	1.000
		90.5	90.5	−0.5	0.7	1.000

λ	$\phi = -0.^\circ5$				$\phi = 14.^\circ5$				$\phi = 29.^\circ5$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.171	1.872	2.006	14.24	0.161	1.762	1.895	13.90	0.141	1.542	1.667	13.60
4197.257	0.172	1.881	2.015	14.31	0.162	1.771	1.904	13.96	0.140	1.533	1.658	13.52
4203.730	0.172	1.880	2.014	14.30	0.164	1.789	1.922	14.09	0.141	1.539	1.664	13.57
4207.566	0.172	1.875	2.009	14.26	0.164	1.783	1.916	14.06	0.143	1.560	1.685	13.75
4216.136	0.172	1.870	2.004	14.22	0.163	1.772	1.905	13.97	0.141	1.533	1.658	13.52
4220.509	0.175	1.900	2.034	14.43	0.164	1.781	1.914	14.04	0.143	1.553	1.678	13.69
4232.887	0.176	1.902	2.036	14.45	0.165	1.784	1.917	14.06	0.145	1.569	1.694	13.82
4233.328	0.174	1.881	2.015	14.31	0.165	1.784	1.917	14.06	0.146	1.579	1.704	13.90
4257.815	0.179	1.923	2.057	14.60	0.170	1.827	1.960	14.37	0.146	1.566	1.691	13.79
4258.477	0.179	1.921	2.055	14.59	0.169	1.814	1.947	14.28	0.145	1.553	1.678	13.69
4265.418	0.178	1.908	2.042	14.50	0.170	1.824	1.957	14.35	0.146	1.563	1.688	13.77
4266.081	0.181	1.940	2.074	14.72	0.170	1.822	1.955	14.34	0.146	1.563	1.688	13.77
4268.915	0.179	1.913	2.047	14.54	0.171	1.825	1.958	14.36	0.146	1.561	1.686	13.76
4276.836	0.179	1.911	2.045	14.53	0.170	1.814	1.947	14.28	0.145	1.550	1.675	13.66
4283.169	0.180	1.919	2.053	14.57	0.170	1.813	1.946	14.26	0.147	1.569	1.694	13.82
4284.838	0.179	1.911	2.045	14.52	0.168	1.791	1.924	14.11	0.145	1.546	1.671	13.63
4287.566	0.181	1.928	2.062	14.64	0.171	1.822	1.955	14.34	0.147	1.568	1.693	13.81
4288.310	0.179	1.901	2.035	14.46	0.171	1.822	1.955	14.34	0.148	1.577	1.702	13.88
4289.525	0.178	1.895	2.029	14.39	0.173	1.843	1.976	14.49	0.146	1.555	1.680	13.71
4290.377	0.180	1.917	2.051	14.56	0.170	1.811	1.944	14.26	0.146	1.555	1.680	13.71
4290.542	0.180	1.916	2.050	14.54	0.171	1.821	1.954	14.33	0.146	1.554	1.679	13.70
4291.630	0.180	1.916	2.050	14.54	0.172	1.831	1.964	14.40	0.146	1.554	1.679	13.70

λ	$\phi = 44.^\circ5$				$\phi = 59.^\circ5$				$\phi = 74.^\circ5$				$\phi = 79.^\circ5$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.102	1.116	1.222	12.16	0.060	0.659	0.740	10.35	0.030	0.329	0.380	10.10	0.019	0.209	0.249	9.70
4197.257	0.102	1.116	1.222	12.16	0.060	0.659	0.740	10.35	0.029	0.319	0.370	9.83	0.019	0.209	0.249	9.70
4203.730	0.103	1.124	1.230	12.24	0.062	0.682	0.763	10.67	0.031	0.329	0.380	10.10	0.019	0.209	0.249	9.70
4207.566	0.104	1.134	1.240	12.34	0.062	0.681	0.762	10.66	0.029	0.319	0.370	9.83	0.020	0.218	0.258	10.05
4216.136	0.104	1.132	1.238	12.32	0.061	0.669	0.750	10.49	0.029	0.318	0.369	9.80	0.019	0.207	0.247	9.62
4220.509	0.104	1.129	1.234	12.28	0.062	0.677	0.758	10.60	0.030	0.329	0.380	10.10	0.020	0.217	0.257	10.01
4232.887	0.106	1.146	1.252	12.46	0.062	0.674	0.755	10.56	0.030	0.326	0.377	10.02	0.019	0.206	0.246	9.58
4233.328	0.105	1.135	1.241	12.35	0.063	0.684	0.765	10.70	0.030	0.326	0.377	10.02	0.020	0.216	0.256	9.97
4257.815	0.108	1.161	1.267	12.61	0.065	0.703	0.784	10.96	0.032	0.346	0.397	10.55	0.022	0.236	0.276	10.75
4258.477	0.106	1.136	1.242	12.36	0.064	0.690	0.771	10.78	0.031	0.336	0.387	10.28	0.019	0.205	0.245	9.54
4265.418	0.104	1.115	1.221	12.15	0.063	0.679	0.760	10.63	0.032	0.345	0.396	10.52	0.020	0.215	0.255	9.93
4266.081	0.107	1.144	1.250	12.44	0.065	0.702	0.783	10.97	0.031	0.334	0.385	10.23	0.022	0.235	0.275	10.71
4268.915	0.108	1.154	1.260	12.54	0.066	0.710	0.791	11.06	0.032	0.344	0.395	10.49	0.021	0.225	0.265	10.32
4276.836	0.106	1.134	1.240	12.34	0.066	0.708	0.789	11.03	0.032	0.343	0.394	10.47	0.021	0.225	0.265	10.32
4283.169	0.108	1.152	1.258	12.52	0.066	0.707	0.788	11.02	0.031	0.333	0.384	10.20	0.020	0.215	0.255	9.93
4284.838	0.106	1.132	1.238	12.32	0.065	0.696	0.777	10.87	0.031	0.333	0.384	10.20	0.021	0.225	0.265	10.32
4287.566	0.108	1.151	1.257	12.51	0.065	0.696	0.777	10.87	0.032	0.343	0.394	10.47	0.021	0.225	0.265	10.32
4288.310	0.107	1.140	1.246	12.40	0.064	0.685	0.766	10.71	0.031	0.333	0.384	10.20	0.020	0.215	0.255	9.93
4289.525	0.106	1.129	1.235	12.29	0.066	0.706	0.787	11.01	0.031	0.333	0.384	10.20	0.022	0.245	0.285	11.10
4290.377	0.104	1.107	1.213	12.07	0.065	0.695	0.776	10.86	0.031	0.332	0.383	10.18	0.021	0.225	0.265	10.32
4290.542	0.104	1.107	1.213	12.07	0.067	0.716	0.797	11.15	0.032	0.342	0.393	10.44	0.021	0.225	0.265	10.32
4291.630	0.103	1.097	1.203	11.97	0.067	0.716	0.797	11.15	0.032	0.342	0.393	10.44	0.022	0.229	0.269	10.48

TABLE 11. — RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908 — Continued.

Plate ω 136. 1908, June 11, 5^h 40^m G. M. T. Measured by L. on T. Distance from Limb 1.8 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		0.5				
⊙	80.3	10.5	10.5	79.5	4.0	1.002
⊙−☊	5.8	25.5	25.5	64.5	2.7	1.000
P	11.4	40.5	40.5	49.5	1.4	1.000
D	0.8	55.5	55.5	34.5	1.0	1.000
Diameter	167.0 mm	70.5	70.5	19.5	0.8	1.000
Factor	1.022	85.5	85.5	4.5	0.7	1.000
		90.5	90.5	−0.5	0.7	1.000

λ	$\phi = -0°.5$				$\phi = 4°.5$				$\phi = 19°.5$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.172	1.882	2.016	14.31	0.166	1.819	1.953	13.91	0.156	1.707	1.838	13.84
4197.257	0.172	1.882	2.016	14.31	0.167	1.826	1.960	13.96	0.156	1.707	1.838	13.84
4203.730	0.174	1.899	2.033	14.42	0.166	1.814	1.948	13.87	0.156	1.703	1.834	13.81
4207.566	0.174	1.896	2.030	14.40	0.167	1.821	1.955	13.92	0.158	1.723	1.854	13.97
4216.136	0.173	1.882	2.016	14.31	0.169	1.839	1.973	14.06	0.157	1.703	1.834	13.82
4220.509	0.175	1.896	2.030	14.40	0.171	1.854	1.988	14.16	0.156	1.692	1.823	13.73
4232.887	0.175	1.903	2.037	14.46	0.171	1.851	1.985	14.14	0.158	1.709	1.840	13.86
4233.328	0.176	1.903	2.037	14.46	0.173	1.870	2.004	14.27	0.158	1.709	1.840	13.86
4257.815	0.180	1.935	2.069	14.69	0.174	1.871	2.005	14.28	0.161	1.727	1.858	13.99
4258.477	0.180	1.932	2.066	14.66	0.176	1.891	2.025	14.42	0.160	1.715	1.846	13.90
4265.418	0.180	1.930	2.064	14.65	0.174	1.858	1.992	14.19	0.160	1.712	1.843	13.88
4266.081	0.180	1.927	2.061	14.63	0.174	1.856	1.990	14.17	0.161	1.722	1.853	13.96
4268.915	0.180	1.924	2.058	14.60	0.175	1.865	1.999	14.24	0.159	1.702	1.833	13.81
4276.836	0.180	1.922	2.056	14.59	0.173	1.845	1.979	14.10	0.162	1.729	1.860	14.01
4283.169	0.179	1.911	2.045	14.52	0.172	1.834	1.968	14.02	0.162	1.728	1.858	13.99
4284.838	0.183	1.951	2.085	14.80	0.175	1.864	1.998	14.23	0.161	1.717	1.848	13.92
4287.566	0.179	1.908	2.042	14.50	0.172	1.834	1.968	14.02	0.160	1.707	1.838	13.84
4288.310	0.180	1.917	2.051	14.56	0.172	1.832	1.966	14.01	0.163	1.737	1.868	14.07
4289.525	0.178	1.896	2.030	14.40	0.173	1.844	1.978	14.09	0.162	1.727	1.858	13.99
4290.377	0.180	1.917	2.051	14.56	0.173	1.844	1.978	14.09	0.162	1.727	1.858	13.99
4290.542	0.182	1.937	2.071	14.70	0.174	1.852	1.986	14.15	0.162	1.727	1.858	13.99
4291.630	0.181	1.927	2.061	14.63	0.174	1.852	1.986	14.15	0.163	1.735	1.864	14.04

λ	$\phi = 34°.5$				$\phi = 49°.5$				$\phi = 64°.5$				$\phi = 79°.5$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.128	1.400	1.520	13.09	0.094	1.028	1.127	12.32	0.052	1.569	0.641	10.57	0.022	0.240	0.280	10.91
4197.257	0.128	1.400	1.520	13.09	0.094	1.028	1.127	12.32	0.052	1.569	0.641	10.57	0.020	0.220	0.260	10.12
4203.730	0.130	1.420	1.540	13.27	0.098	1.065	1.164	12.72	0.052	1.567	0.639	10.54	0.020	0.219	0.259	10.10
4207.566	0.130	1.417	1.537	13.24	0.101	1.102	1.201	13.13	0.054	1.590	0.662	10.92	0.021	0.029	0.269	10.48
4216.136	0.128	1.392	1.512	13.03	0.097	1.052	1.151	12.58	0.051	1.555	0.627	10.34	0.020	0.219	0.259	10.10
4220.509	0.132	1.431	1.551	13.36	0.099	1.070	1.169	12.78	0.054	1.588	0.660	10.88	0.021	0.228	0.268	10.44
4232.887	0.132	1.428	1.548	13.34	0.097	1.048	1.147	12.54	0.054	1.585	0.657	10.83	0.020	0.218	0.258	10.06
4233.328	0.132	1.428	1.548	13.34	0.097	1.048	1.147	12.54	0.053	1.574	0.646	10.65	0.020	0.218	0.258	10.06
4257.815	0.134	1.440	1.560	13.44	0.100	1.074	1.173	12.82	0.054	1.580	0.652	10.76	0.022	0.236	0.276	10.75
4258.477	0.134	1.439	1.559	13.43	0.098	1.052	1.151	12.58	0.054	1.579	0.651	10.74	0.020	0.216	0.256	9.97
4265.418	0.134	1.437	1.557	13.41	0.099	1.061	1.160	12.68	0.055	1.589	0.661	10.90	0.022	0.236	0.276	10.75
4266.081	0.134	1.435	1.555	13.40	0.101	1.081	1.180	12.90	0.054	1.579	0.651	10.74	0.022	0.236	0.276	10.75
4268.915	0.135	1.441	1.561	13.45	0.100	1.070	1.169	12.78	0.055	1.589	0.661	10.90	0.022	0.236	0.276	10.75
4276.836	0.135	1.441	1.561	13.45	0.100	1.068	1.167	12.76	0.056	1.599	0.671	11.07	0.020	0.216	0.256	9.97
4283.169	0.134	1.431	1.551	13.36	0.100	1.066	1.165	12.74	0.056	1.596	0.668	11.02	0.022	0.236	0.276	10.75
4284.838	0.135	1.446	1.566	13.49	0.099	1.057	1.156	12.64	0.056	1.596	0.668	11.02	0.020	0.214	0.254	9.90
4287.566	0.134	1.431	1.551	13.36	0.098	1.046	1.145	12.52	0.056	1.595	0.667	11.00	0.021	0.225	0.265	10.32
4288.310	0.136	1.449	1.569	13.52	0.100	1.065	1.164	12.72	0.053	1.564	0.636	10.48	0.022	0.235	0.275	10.71
4289.525	0.135	1.441	1.561	13.45	0.100	1.064	1.163	12.71	0.055	1.607	0.679	11.20	0.021	0.225	0.265	10.32
4290.377	0.134	1.431	1.551	13.36	0.099	1.054	1.153	12.60	0.056	1.597	0.669	11.04	0.020	0.214	0.254	9.90
4290.542	0.136	1.448	1.568	13.51	0.098	1.044	1.143	12.49	0.056	1.597	0.669	11.04	0.020	0.214	0.254	9.90
4291.630	0.136	1.449	1.569	13.52	0.099	1.053	1.152	12.59	0.058	1.607	0.679	11.20	0.022	0.235	0.275	10.71

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 146. 1908, Aug. 5, 9^h 50^m G. M. T. Measured by L. on T. Distance from Limb 1.3 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		−0.3				
⊙	133.0	13.2	14.6	75.4	25.3	1.106
⊙−☊	58.5	28.7	29.3	60.7	12.7	1.025
P	−12.7	44.2	44.5	45.5	8.8	1.012
D	6.2	59.7	59.9	30.1	7.2	1.008
Diameter	168.6 mm	74.7	74.8	15.2	6.4	1.006
Factor	1.016	89.7	89.7	0.3	6.2	1.006

λ	$\phi = 0.3°$				$\phi = 15.2°$				$\phi = 30.1°$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.171	1.872	2.006	14.24	0.164	1.794	1.926	14.17	0.139	1.525	1.646	13.51
4197.257	0.172	1.881	2.015	14.31	0.165	1.804	1.936	14.24	0.140	1.533	1.654	13.57
4203.730	0.173	1.887	2.021	14.35	0.166	1.810	1.942	14.29	0.140	1.530	1.651	13.55
4207.566	0.170	1.854	1.988	14.11	0.165	1.798	1.930	14.20	0.142	1.551	1.672	13.72
4216.136	0.172	1.870	2.004	14.23	0.165	1.794	1.926	14.17	0.141	1.535	1.656	13.59
4220.509	0.173	1.879	2.013	14.29	0.166	1.802	1.934	14.23	0.140	1.523	1.644	13.49
4232.887	0.176	1.904	2.038	14.47	0.167	1.805	1.937	14.25	0.141	1.529	1.650	13.54
4233.328	0.177	1.914	2.048	14.54	0.167	1.805	1.937	14.25	0.142	1.538	1.659	13.61
4257.815	0.178	1.913	2.047	14.53	0.169	1.815	1.947	14.32	0.144	1.546	1.667	13.68
4258.477	0.177	1.902	2.036	14.45	0.167	1.791	1.923	14.15	0.143	1.536	1.657	13.60
4265.418	0.178	1.901	2.035	14.45	0.168	1.800	1.932	14.21	0.143	1.536	1.657	13.60
4266.081	0.179	1.918	2.052	14.57	0.170	1.819	1.951	14.35	0.143	1.536	1.657	13.60
4268.915	0.180	1.927	2.061	14.63	0.168	1.799	1.931	14.21	0.143	1.535	1.656	13.59
4276.836	0.178	1.898	2.032	14.42	0.168	1.794	1.926	14.17	0.144	1.538	1.659	13.61
4283.169	0.178	1.897	2.031	14.42	0.170	1.812	1.944	14.30	0.144	1.538	1.659	13.61
4284.838	0.179	1.907	2.041	14.49	0.168	1.792	1.924	14.15	0.143	1.527	1.648	13.52
4287.566	0.177	1.886	2.020	14.34	0.170	1.812	1.944	14.30	0.143	1.526	1.647	13.52
4288.310	0.178	1.895	2.029	14.40	0.168	1.790	1.922	14.14	0.147	1.570	1.691	13.88
4289.525	0.177	1.885	2.019	14.33	0.170	1.810	1.942	14.29	0.143	1.530	1.651	13.55
4290.377	0.178	1.896	2.030	14.41	0.171	1.820	1.952	14.36	0.143	1.528	1.649	13.53
4290.542	0.179	1.905	2.039	14.48	0.169	1.798	1.930	14.20	0.144	1.537	1.658	13.61
4291.630	0.178	1.894	2.028	14.40	0.168	1.790	1.922	14.14	0.146	1.557	1.678	13.77

λ	$\phi = 45.5°$				$\phi = 60.7°$				$\phi = 75.4°$			
4196.699	0.105	1.155	1.256	12.72	0.059	0.652	0.725	10.53	0.028	0.337	0.377	10.62
4197.257	0.105	1.155	1.256	12.72	0.059	0.652	0.725	10.53	0.030	0.361	0.401	11.29
4203.730	0.106	1.163	1.264	12.80	0.063	0.698	0.771	11.20	0.032	0.382	0.422	11.88
4207.566	0.106	1.162	1.263	12.79	0.062	0.685	0.758	11.01	0.030	0.360	0.400	11.27
4216.136	0.106	1.156	1.257	12.73	0.062	0.683	0.756	10.98	0.029	0.348	0.388	10.93
4220.509	0.106	1.155	1.256	12.72	0.062	0.683	0.756	10.98	0.030	0.358	0.398	11.21
4232.887	0.106	1.153	1.254	12.70	0.062	0.683	0.756	10.98	0.031	0.369	0.409	11.52
4233.328	0.108	1.175	1.276	12.92	0.064	0.705	0.778	11.30	0.030	0.357	0.397	11.18
4257.815	0.108	1.168	1.269	12.85	0.064	0.701	0.774	11.24	0.032	0.376	0.416	11.72
4258.477	0.109	1.174	1.275	12.91	0.064	0.698	0.771	11.20	0.031	0.365	0.405	11.41
4265.418	0.107	1.153	1.254	12.70	0.064	0.698	0.771	11.20	0.032	0.376	0.416	11.72
4266.081	0.110	1.186	1.287	13.04	0.063	0.688	0.761	11.05	0.031	0.365	0.405	11.41
4268.915	0.109	1.172	1.273	12.89	0.064	0.695	0.768	11.15	0.032	0.375	0.415	11.69
4276.836	0.107	1.150	1.251	12.67	0.064	0.695	0.768	11.15	0.030	0.352	0.392	11.04
4283.169	0.108	1.159	1.260	12.76	0.063	0.684	0.757	10.99	0.031	0.364	0.404	11.38
4284.838	0.108	1.158	1.259	12.75	0.062	0.675	0.748	10.86	0.033	0.386	0.426	12.00
4287.566	0.108	1.157	1.258	12.74	0.062	0.675	0.748	10.86	0.031	0.363	0.403	11.35
4288.310	0.110	1.178	1.279	12.95	0.064	0.694	0.767	11.14	0.032	0.375	0.415	11.69
4289.525	0.108	1.170	1.271	12.87	0.062	0.674	0.747	10.85	0.031	0.363	0.403	11.35
4290.377	0.109	1.179	1.280	12.96	0.061	0.663	0.736	10.69	0.030	0.352	0.392	11.04
4290.542	0.108	1.168	1.269	12.85	0.063	0.683	0.756	10.98	0.033	0.386	0.426	12.00
4291.630	0.108	1.167	1.268	12.84	0.060	0.651	0.724	10.51	0.030	0.352	0.392	11.04

TABLE II. — RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908 — Continued.

Plate ω 147. 1908, Aug. 5, 10^h 30^m G. M. T. Measured by L. on T. Distance from Limb 1.5 mm. Quality, good.

	°	$p-P$ °	π °	ϕ °	η °	sec η
		−0.3				
⊙	133.0	13.2	14.6	75.4	25.3	1.106
⊙−☊	58.5	28.7	29.3	60.7	12.7	1.025
P	−12.7	44.2	44.5	45.5	8.8	1.012
D	6.2	59.7	59.9	30.1	7.2	1.008
Diameter	168.6 mm	74.7	74.8	15.2	6.4	1.006
Factor	1.018	89.7	89.7	0.3	6.2	1.006

λ	$\phi = 0.^\circ3$				$\phi = 15.^\circ2$				$\phi = 30.^\circ1$			
	Δ	v km	$v+v_1$ km	ξ °	Δ	v km	$v+v_1$ km	ξ °	Δ	v km	$v+v_1$ km	ξ °
4196.699	0.174	1.905	2.039	14.48	0.164	1.796	1.928	14.18	0.143	1.568	1.689	13.86
4197.257	0.174	1.905	2.039	14.48	0.165	1.806	1.938	14.26	0.143	1.568	1.689	13.86
4203.730	0.075	1.912	2.046	14.53	0.167	1.825	1.957	14.40	0.144	1.578	1.699	13.94
4207.566	0.176	1.921	2.055	14.59	0.168	1.833	1.965	14.46	0.144	1.574	1.695	13.91
4216.136	0.175	1.905	2.039	14.48	0.166	1.807	1.939	14.26	0.143	1.554	1.675	13.75
4220.509	0.176	1.914	2.048	14.54	0.168	1.827	1.959	14.41	0.145	1.574	1.695	13.91
4232.887	0.177	1.917	2.051	14.56	0.168	1.820	1.952	14.36	0.145	1.573	1.694	13.90
4233.328	0.178	1.927	2.061	14.63	0.168	1.819	1.951	14.35	0.144	1.562	1.683	13.81
4257.815	0.179	1.925	2.059	14.62	0.170	1.828	1.960	14.42	0.146	1.570	1.691	13.88
4258.477	0.178	1.914	2.048	14.54	0.170	1.828	1.960	14.42	0.146	1.570	1.691	13.88
4265.418	0.179	1.922	2.056	14.60	0.173	1.856	1.988	14.62	0.146	1.569	1.690	13.87
4266.081	0.180	1.931	2.065	14.66	0.170	1.825	1.957	14.40	0.144	1.542	1.663	13.65
4268.915	0.178	1.908	2.042	14.50	0.170	1.823	1.955	14.38	0.148	1.583	1.704	13.98
4276.836	0.179	1.916	2.050	14.55	0.171	1.826	1.958	14.40	0.146	1.562	1.683	13.81
4283.169	0.180	1.921	2.055	14.59	0.171	1.826	1.958	14.40	0.145	1.551	1.672	13.72
4284.838	0.180	1.920	2.054	14.58	0.173	1.847	1.979	14.56	0.146	1.565	1.686	13.84
4287.566	0.181	1.930	2.064	14.65	0.172	1.835	1.967	14.47	0.146	1.564	1.685	13.83
4288.310	0.180	1.919	2.053	14.58	0.173	1.846	1.978	14.55	0.145	1.554	1.675	13.74
4289.525	0.181	1.929	2.063	14.65	0.174	1.856	1.988	14.63	0.148	1.581	1.702	13.97
4290.377	0.180	1.919	2.053	14.58	0.170	1.812	1.944	14.30	0.146	1.562	1.683	13.81
4290.542	0.180	1.918	2.052	14.57	0.171	1.822	1.954	14.38	0.145	1.552	1.673	13.73
4291.630	0.180	1.918	2.052	14.57	0.172	1.832	1.964	14.45	0.148	1.580	1.701	13.96

λ	$\phi = 45.^\circ5$				$\phi = 60.^\circ7$				$\phi = 75.^\circ4$			
4196.699	0.102	1.132	1.233	12.49	0.062	0.689	0.762	11.07	0.029	0.349	0.389	10.96
4197.257	0.104	1.145	1.246	12.62	0.062	0.689	0.762	11.07	0.030	0.358	0.398	11.21
4203.730	0.106	1.164	1.265	12.81	0.063	0.698	0.771	11.20	0.030	0.357	0.397	11.18
4207.566	0.106	1.163	1.264	12.80	0.063	0.698	0.771	11.20	0.030	0.357	0.397	11.18
4216.136	0.107	1.171	1.272	12.88	0.063	0.697	0.770	11.18	0.029	0.347	0.387	10.90
4220.509	0.106	1.157	1.258	12.74	0.063	0.697	0.770	11.18	0.032	0.379	0.419	11.80
4232.887	0.106	1.156	1.257	12.73	0.063	0.697	0.770	11.18	0.030	0.354	0.394	11.10
4233.328	0.108	1.176	1.277	12.93	0.066	0.727	0.800	11.62	0.030	0.354	0.394	11.10
4257.815	0.109	1.179	1.280	12.96	0.066	0.719	0.792	11.50	0.032	0.370	0.410	11.55
4258.477	0.110	1.189	1.290	13.07	0.066	0.719	0.792	11.50	0.032	0.370	0.410	11.55
4265.418	0.108	1.162	1.263	12.79	0.066	0.719	0.792	11.50	0.032	0.370	0.410	11.55
4266.081	0.108	1.162	1.263	12.79	0.065	0.706	0.779	11.31	0.030	0.350	0.390	10.98
4268.915	0.109	1.171	1.272	12.88	0.065	0.706	0.779	11.31	0.030	0.350	0.390	10.98
4276.836	0.109	1.171	1.272	12.88	0.066	0.715	0.788	11.44	0.031	0.360	0.400	11.27
4283.169	0.108	1.160	1.261	12.77	0.065	0.705	0.778	11.30	0.032	0.370	0.410	11.55
4284.838	0.111	1.192	1.293	13.10	0.066	0.715	0.788	11.44	0.032	0.370	0.410	11.55
4287.566	0.108	1.163	1.264	12.80	0.068	0.738	0.811	11.78	0.032	0.370	0.410	11.55
4288.310	0.110	1.182	1.283	13.00	0.067	0.728	0.801	11.63	0.030	0.350	0.390	10.98
4289.525	0.111	1.191	1.292	13.09	0.065	0.705	0.778	11.30	0.032	0.370	0.410	11.55
4290.377	0.109	1.169	1.270	12.86	0.064	0.695	0.768	11.15	0.031	0.360	0.400	11.27
4290.542	0.109	1.169	1.270	12.86	0.065	0.704	0.777	11.28	0.030	0.350	0.390	10.98
4291.630	0.110	1.179	1.280	12.96	0.065	0.704	0.777	11.28	0.033	0.385	0.425	11.97

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 148. 1908, Aug. 5, $10^h\ 30^m$ G. M. T. Measured by L. on T. Distance from Limb 1.4 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		−0.3				
⊙	133.0	13.2	14.6	75.4	25.3	1.106
⊙−Ω	58.5	28.7	29.3	60.7	12.7	1.025
P	−12.7	44.2	44.5	45.5	8.8	1.012
D	6.2	59.7	59.9	30.1	7.2	1.008
Diameter	168.6 mm	74.7	74.8	15.2	6.4	1.006
Factor	1.017	89.7	89.7	0.3	6.2	1.006

λ	$\phi = 0°.3$				$\phi = 15°.2$				$\phi = 30°.1$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.173	1.896	2.030	14.41	0.166	1.817	1.949	14.34	0.142	1.558	1.679	13.78
4197.257	0.175	1.916	2.050	14.55	0.165	1.807	1.939	14.26	0.143	1.568	1.689	13.86
4203.730	0.174	1.903	2.037	14.46	0.166	1.811	1.943	14.29	0.144	1.576	1.697	13.93
4207.566	0.176	1.921	2.055	14.59	0.167	1.821	1.953	14.37	0.146	1.597	1.718	14.10
4216.136	0.176	1.913	2.047	14.53	0.167	1.818	1.950	14.35	0.144	1.570	1.691	13.88
4220.509	0.178	1.936	2.070	14.70	0.169	1.831	1.963	14.44	0.145	1.579	1.700	13.95
4232.887	0.176	1.911	2.045	14.52	0.167	1.811	1.943	14.29	0.145	1.573	1.694	13.90
4233.328	0.178	1.927	2.061	14.64	0.170	1.841	1.973	14.52	0.144	1.562	1.683	13.81
4257.815	0.178	1.915	2.049	14.55	0.170	1.827	1.959	14.41	0.146	1.574	1.695	13.91
4258.477	0.178	1.914	2.048	14.54	0.168	1.807	1.939	14.26	0.147	1.583	1.704	13.98
4265.418	0.180	1.929	2.063	14.65	0.170	1.824	1.956	14.39	0.145	1.560	1.681	13.79
4266.081	0.180	1.928	2.062	14.64	0.170	1.824	1.956	14.39	0.146	1.569	1.690	13.87
4268.915	0.178	1.908	2.042	14.50	0.172	1.842	1.974	14.52	0.146	1.563	1.684	13.82
4276.836	0.175	1.873	2.007	14.27	0.172	1.841	1.973	14.52	0.147	1.573	1.694	13.90
4283.169	0.181	1.935	2.069	14.69	0.170	1.815	1.947	14.33	0.146	1.562	1.683	13.81
4284.838	0.182	1.945	2.079	14.76	0.170	1.815	1.947	14.33	0.146	1.561	1.682	13.80
4287.566	0.182	1.943	2.077	14.75	0.173	1.849	1.981	14.57	0.144	1.540	1.661	13.63
4288.310	0.181	1.931	2.065	14.66	0.172	1.837	1.969	14.49	0.145	1.550	1.671	13.71
4289.525	0.182	1.941	2.075	14.73	0.172	1.836	1.968	14.48	0.147	1.570	1.691	13.88
4290.377	0.181	1.929	2.063	14.65	0.172	1.835	1.967	14.47	0.147	1.570	1.691	13.88
4290.542	0.182	1.939	2.073	14.72	0.174	1.853	1.985	14.60	0.146	1.559	1.680	13.78
4291.630	0.182	1.939	2.073	14.72	0.172	1.833	1.965	14.46	0.146	1.559	1.680	13.78

λ	$\phi = 45°.5$				$\phi = 60°.7$				$\phi = 75°.4$			
4196.699	0.107	1.177	1.278	12.94	0.064	0.713	0.786	11.41	0.029	0.348	0.388	10.93
4197.257	0.105	1.157	1.258	12.74	0.064	0.713	0.786	11.41	0.030	0.358	0.398	11.21
4203.730	0.106	1.165	1.266	12.82	0.067	0.733	0.806	11.70	0.030	0.358	0.398	11.21
4207.566	0.107	1.174	1.275	12.91	0.065	0.721	0.794	11.53	0.031	0.368	0.408	11.49
4216.136	0.106	1.158	1.259	12.75	0.064	0.710	0.783	11.37	0.030	0.356	0.396	11.15
4220.509	0.108	1.177	1.278	12.94	0.066	0.730	0.803	11.66	0.031	0.366	0.406	11.43
4232.887	0.107	1.165	1.266	12.82	0.068	0.738	0.811	11.78	0.031	0.366	0.406	11.43
4233.328	0.107	1.165	1.266	12.82	0.065	0.716	0.789	11.46	0.032	0.376	0.416	11.72
4257.815	0.107	1.153	1.254	12.70	0.068	0.733	0.806	11.70	0.031	0.361	0.401	11.29
4258.477	0.108	1.163	1.264	12.80	0.068	0.732	0.805	11.69	0.032	0.371	0.411	11.58
4265.418	0.107	1.153	1.254	12.70	0.068	0.731	0.804	11.67	0.031	0.361	0.401	11.29
4266.081	0.108	1.163	1.264	12.80	0.066	0.720	0.793	11.52	0.031	0.361	0.401	11.29
4268.915	0.107	1.151	1.252	12.68	0.068	0.728	0.801	11.63	0.032	0.371	0.411	11.58
4276.836	0.108	1.161	1.262	12.78	0.068	0.728	0.801	11.63	0.032	0.371	0.411	11.58
4283.169	0.110	1.181	1.282	12.98	0.069	0.738	0.811	11.78	0.031	0.361	0.401	11.29
4284.838	0.108	1.159	1.260	12.76	0.067	0.718	0.791	11.49	0.032	0.360	0.400	11.27
4287.566	0.107	1.149	1.250	12.66	0.068	0.728	0.801	11.63	0.030	0.350	0.390	10.98
4288.310	0.108	1.161	1.262	12.78	0.067	0.727	0.800	11.62	0.032	0.370	0.410	11.55
4289.525	0.110	1.181	1.282	12.98	0.068	0.726	0.799	11.60	0.031	0.360	0.400	11.27
4290.377	0.108	1.160	1.261	12.77	0.066	0.718	0.791	11.49	0.032	0.370	0.410	11.55
4290.542	0.110	1.179	1.280	12.96	0.067	0.726	0.799	11.60	0.032	0.370	0.410	11.55
4291.630	0.108	1.158	1.259	12.75	0.067	0.726	0.799	11.60	0.031	0.360	0.400	11.27

TABLE 11. — RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908 — Continued.

Plate ω 151. 1908, Aug. 6, $5^h\ 15^m$ G. M. T. Measured by L. on T. Distance from Limb 1.5 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		0.3				
⊙	133.8	13.8	15.1	74.9	24.6	1.100
⊙−☊	59.3	29.6	30.2	59.8	12.5	1.024
P	−13.1	45.1	45.4	44.6	8.8	1.012
D	6.3	75.3	75.4	14.6	6.4	1.006
Diameter	168.6 mm	90.3	90.3	−0.3	6.2	1.006
Factor	1.018					

λ	$\phi = -0^\circ.3$				$\phi = -0^\circ.3$				$\phi = 14^\circ.6$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.174	1.908	2.042	14.50	0.173	1.899	2.033	14.43	0.163	1.788	1.920	14.09
4197.257	0.175	1.918	2.052	14.57	0.175	1.918	2.052	14.57	0.164	1.797	1.929	14.15
4203.730	0.177	1.936	2.070	14.70	0.178	1.936	2.070	14.70	0.166	1.815	1.947	14.28
4207.566	0.176	1.918	2.052	14.57	0.177	1.928	2.062	14.64	0.165	1.803	1.935	14.20
4216.136	0.176	1.915	2.049	14.55	0.175	1.905	2.039	14.47	0.165	1.799	1.931	14.17
4220.509	0.176	1.911	2.045	14.52	0.177	1.921	2.055	14.60	0.167	1.813	1.945	14.28
4232.887	0.180	1.949	2.083	14.79	0.176	1.908	2.042	14.50	0.168	1.821	1.953	14.32
4233.328	0.177	1.918	2.052	14.57	0.177	1.918	2.052	14.57	0.168	1.821	1.953	14.32
4257.815	0.180	1.937	2.071	14.71	0.180	1.937	2.071	14.71	0.169	1.819	1.951	14.31
4258.477	0.182	1.959	2.093	14.86	0.179	1.928	2.062	14.64	0.168	1.809	1.941	14.24
4265.418	0.179	1.923	2.057	14.61	0.180	1.933	0.067	14.68	0.170	1.827	1.959	14.38
4266.081	0.180	1.932	2.066	14.67	0.179	1.922	2.056	14.61	0.170	1.826	1.958	14.37
4268.915	0.180	1.930	2.064	14.66	0.180	1.930	2.064	14.65	0.171	1.829	1.961	14.39
4276.836	0.180	1.928	2.062	14.64	0.180	1.928	2.062	14.64	0.171	1.828	1.960	14.38
4283.169	0.181	1.933	2.067	14.68	0.179	1.913	2.047	14.54	0.170	1.818	1.950	14.30
4284.838	0.181	1.933	2.067	14.68	0.181	1.933	2.067	14.68	0.172	1.838	1.970	14.45
4287.566	0.180	1.922	2.056	14.60	0.181	1.932	2.066	14.67	0.170	1.818	1.950	14.30
4288.310	0.179	1.912	2.046	14.53	0.181	1.932	2.066	14.67	0.172	1.837	1.969	14.44
4289.525	0.182	1.942	2.076	14.74	0.182	1.942	2.076	14.74	0.171	1.827	1.959	14.37
4290.377	0.180	1.921	2.055	14.59	0.181	1.931	2.065	14.66	0.171	1.827	1.959	14.37
4290.542	0.182	1.942	2.076	14.74	0.181	1.932	2.066	14.67	0.173	1.845	1.977	14.50
4291.630	0.181	1.931	2.065	14.66	0.182	1.941	2.075	14.73	0.172	1.835	1.967	14.43
	$\phi = 44^\circ.6$				$\phi = 59^\circ.8$				$\phi = 74^\circ.9$			
4196.699	0.105	1.159	1.260	12.56	0.065	0.724	0.797	11.25	0.029	0.348	0.388	10.57
4197.257	0.105	1.158	1.259	12.55	0.064	0.714	0.787	11.11	0.030	0.358	0.398	10.85
4203.730	0.106	1.164	1.265	12.61	0.066	0.734	0.807	11.39	0.030	0.357	0.397	10.82
4207.566	0.106	1.162	1.263	12.59	0.067	0.745	0.818	11.55	0.031	0.368	0.408	11.12
4216.136	0.104	1.140	1.241	12.37	0.066	0.732	0.805	11.36	0.031	0.367	0.407	11.09
4220.509	0.106	1.159	1.260	12.56	0.066	0.732	0.805	11.36	0.030	0.357	0.397	10.82
4232.887	0.108	1.178	1.279	12.75	0.067	0.739	0.812	11.46	0.031	0.365	0.405	11.03
4233.328	0.108	1.178	1.279	12.75	0.068	0.749	0.822	11.60	0.031	0.365	0.405	11.03
4257.815	0.109	1.177	1.278	12.74	0.069	0.753	0.826	11.66	0.033	0.388	0.428	11.66
4258.477	0.108	1.166	1.267	12.63	0.067	0.733	0.806	11.38	0.032	0.376	0.416	11.34
4265.418	0.108	1.164	1.265	12.61	0.064	0.702	0.775	10.94	0.032	0.376	0.416	11.34
4266.081	0.109	1.174	1.275	12.71	0.065	0.711	0.784	11.06	0.032	0.374	0.414	11.28
4268.915	0.108	1.164	1.265	12.61	0.069	0.750	0.823	11.61	0.032	0.374	0.414	11.28
4276.836	0.109	1.172	1.273	12.69	0.068	0.739	0.812	11.46	0.032	0.374	0.414	11.28
4283.169	0.110	1.182	1.283	12.79	0.068	0.739	0.812	11.46	0.033	0.384	0.424	11.55
4284.838	0.109	1.171	1.272	12.68	0.068	0.739	0.812	11.46	0.034	0.396	0.436	11.88
4287.566	0.110	1.181	1.282	12.78	0.069	0.749	0.822	11.60	0.034	0.396	0.436	11.88
4288.310	0.108	1.161	1.262	12.58	0.066	0.718	0.791	11.16	0.032	0.374	0.414	11.28
4289.525	0.109	1.170	1.271	12.67	0.068	0.739	0.812	11.46	0.032	0.374	0.414	11.28
4290.377	0.109	1.170	1.271	12.67	0.068	0.739	0.812	11.46	0.033	0.385	0.425	11.58
4290.542	0.110	1.180	1.281	12.77	0.068	0.739	0.812	11.46	0.033	0.396	0.436	11.88
4291.630	0.110	1.180	1.281	12.77	0.071	0.771	0.844	11.75	0.034	0.396	0.436	11.88

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 161. 1908, Aug. 26, $11^h\ 0^m$ G. M. T. Measured by L. on T. Distance from Limb 1.1 mm. Quality, good.

	°	$p-P$	π	ϕ	η	sec η
		°	°	°	°	
		−0.3				
⊙	153.3	24.1	25.0	65.0	17.0	1.049
⊙−☊	78.8	40.1	40.6	49.4	11.0	1.018
P	−19.8	55.5	55.8	34.2	8.6	1.016
D	7.1	70.7	70.9	19.1	7.5	1.009
Diameter	168.9 mm	79.0	79.1	10.9	7.2	1.008
Factor	1.013	85.8	85.8	4.2	7.1	1.008

λ	$\phi = 4°.2$				$\phi = 10°.9$				$\phi = 19°.1$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.172	1.879	2.015	14.34	0.168	1.836	1.970	14.24	0.159	1.739	1.867	14.04
4197.257	0.173	1.888	2.024	14.41	0.168	1.836	1.970	14.24	0.159	1.739	1.867	14.04
4203.730	0.175	1.913	2.049	14.59	0.169	1.840	1.974	14.27	0.162	1.766	1.890	14.21
4207.566	0.175	1.910	2.046	14.56	0.168	1.828	1.962	14.19	0.161	1.753	1.881	14.14
4216.136	0.175	1.908	2.044	14.55	0.168	1.826	1.960	14.17	0.161	1.751	1.879	14.13
4220.509	0.176	1.905	2.041	14.53	0.172	1.867	2.001	14.47	0.163	1.766	1.894	14.24
4232.887	0.176	1.902	2.038	14.51	0.173	1.869	2.003	14.49	0.164	1.774	1.902	14.30
4233.328	0.176	1.902	2.038	14.51	0.172	1.859	1.993	14.42	0.165	1.784	1.912	14.37
4257.815	0.179	1.920	2.056	14.63	0.176	1.884	2.018	14.59	0.163	1.744	1.872	14.08
4258.477	0.178	1.910	2.046	14.56	0.174	1.864	1.998	14.45	0.164	1.753	1.881	14.14
4265.418	0.179	1.918	2.054	14.62	0.172	1.842	1.976	14.29	0.164	1.753	1.881	14.14
4266.081	0.179	1.917	2.053	14.61	0.175	1.867	2.001	14.47	0.167	1.783	1.911	14.36
4268.915	0.180	1.926	2.062	14.68	0.174	1.856	1.990	14.39	0.166	1.772	1.900	14.28
4276.836	0.176	1.878	2.014	14.34	0.174	1.855	1.989	14.38	0.164	1.751	1.879	14.13
4283.169	0.180	1.918	2.054	14.62	0.175	1.865	1.999	14.46	0.167	1.781	1.909	14.35
4284.838	0.180	1.916	2.052	14.61	0.174	1.855	1.989	14.38	0.165	1.760	1.888	14.19
4287.566	0.180	1.916	2.052	14.61	0.175	1.864	1.998	14.45	0.165	1.760	1.888	14.19
4288.310	0.179	1.906	2.042	14.54	0.175	1.864	1.998	14.45	0.165	1.760	1.888	14.19
4289.525	0.179	1.906	2.042	14.54	0.174	1.854	1.988	14.38	0.162	1.725	1.853	13.93
4290.377	0.179	1.905	2.041	14.53	0.174	1.854	1.988	14.38	0.162	1.725	1.853	13.93
4290.542	0.180	1.915	2.051	14.60	0.174	1.853	1.987	14.37	0.164	1.747	1.875	14.10
4291.630	0.180	1.915	2.051	14.60	0.176	1.873	2.006	14.51	0.166	1.768	1.896	14.25
	$\phi = 34°.2$				$\phi = 49°.4$				$\phi = 65°.0$			
4196.699	0.128	1.404	1.519	13.03	0.088	0.972	1.061	11.57	0.048	0.541	0.599	10.06
4197.257	0.128	1.404	1.519	13.03	0.088	0.972	1.061	11.57	0.048	0.541	0.599	10.06
4203.730	0.128	1.412	1.528	13.12	0.090	0.992	1.081	11.79	0.049	0.551	0.609	10.23
4207.566	0.131	1.430	1.545	13.25	0.090	0.990	1.079	11.77	0.050	0.561	0.619	10.40
4216.136	0.132	1.438	1.553	13.32	0.090	0.988	1.077	11.75	0.047	0.530	0.588	9.88
4220.509	0.131	1.426	1.541	13.22	0.092	1.005	1.094	11.93	0.050	0.559	0.617	10.37
4232.887	0.132	1.434	1.549	13.29	0.091	0.994	1.083	11.81	0.051	0.569	0.627	10.54
4233.328	0.132	1.431	1.546	13.26	0.090	0.984	1.073	11.70	0.051	0.569	0.627	10.54
4257.815	0.135	1.450	1.565	13.43	0.092	0.996	1.085	11.83	0.054	0.599	0.657	11.04
4258.477	0.135	1.450	1.565	13.43	0.092	0.996	1.085	11.83	0.054	0.598	0.656	11.02
4265.418	0.133	1.429	1.544	13.24	0.090	0.974	1.063	11.59	0.053	0.588	0.646	10.85
4266.081	0.135	1.445	1.560	13.38	0.092	0.992	1.081	11.79	0.052	0.575	0.633	10.63
4268.915	0.135	1.445	1.560	13.38	0.093	1.002	1.091	11.90	0.053	0.585	0.643	10.80
4276.836	0.133	1.424	1.539	13.20	0.092	0.992	1.081	11.79	0.053	0.585	0.643	10.80
4283.169	0.134	1.435	1.550	13.30	0.092	0.992	1.081	11.79	0.052	0.575	0.633	10.63
4284.838	0.134	1.435	1.550	13.30	0.090	0.972	1.061	11.57	0.052	0.576	0.634	10.65
4287.566	0.134	1.435	1.550	13.30	0.092	0.991	1.080	11.78	0.053	0.586	0.644	10.82
4288.310	0.136	1.451	1.566	13.43	0.093	1.001	1.090	11.89	0.053	0.586	0.644	10.82
4289.525	0.133	1.421	1.536	13.18	0.092	0.991	1.080	11.78	0.051	0.565	0.623	10.47
4290.377	0.135	1.441	1.556	13.35	0.091	0.981	1.070	11.67	0.052	0.575	0.633	10.63
4290.542	0.135	1.441	1.556	13.35	0.093	1.001	1.090	11.89	0.054	0.595	0.653	10.97
4291.630	0.133	1.420	1.535	13.17	0.095	1.021	1.110	12.11	0.054	0.595	0.653	10.97

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 162. 1908, Aug. 26, $11^h\ 0^m$ G. M. T. Measured by L. on T. Distance from Limb 1.1 mm. Quality, good.

	°	$p-P$ °	π °	ϕ °	η °	sec η
		−0.3				
⊙	153.3	24.1	25.0	65.0	17.0	1.046
⊙−☊	78.8	40.1	40.6	49.4	11.0	1.019
P	−19.8	55.5	55.8	34.2	8.6	1.011
D	7.1	70.7	70.9	19.1	7.5	1.009
Diameter	168.9 mm	79.0	79.1	10.9	7.2	1.008
Factor	1.013	85.8	85.8	4.2	7.1	1.008

λ	$\phi = 4°.2$				$\phi = 10°.9$				$\phi = 19°.1$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.174	1.901	2.037	14.50	0.168	1.838	1.972	14.25	0.157	1.719	1.847	13.88
4197.257	0.174	1.901	2.037	14.50	0.168	1.838	1.972	14.25	0.158	1.728	1.856	13.95
4203.730	0.175	1.909	2.045	14.56	0.170	1.853	1.987	14.36	0.160	1.743	1.871	14.06
4207.566	0.176	1.914	2.050	14.59	0.169	1.841	1.975	14.27	0.161	1.751	1.879	14.13
4216.136	0.175	1.901	2.037	14.50	0.170	1.848	1.982	14.32	0.159	1.729	1.857	13.97
4220.509	0.177	1.917	2.053	14.61	0.170	1.845	1.979	14.30	0.162	1.755	1.883	14.16
4232.887	0.178	1.924	2.060	14.66	0.170	1.840	1.974	14.26	0.161	1.743	1.871	14.07
4233.328	0.180	1.944	2.080	14.80	0.173	1.870	2.004	14.48	0.164	1.773	1.901	14.29
4257.815	0.179	1.921	2.057	14.64	0.172	1.848	1.982	14.32	0.165	1.766	1.894	14.25
4258.477	0.178	1.910	2.046	14.56	0.173	1.857	1.991	14.39	0.164	1.754	1.882	14.15
4265.418	0.179	1.915	2.051	14.59	0.173	1.854	1.988	14.37	0.163	1.742	1.870	14.06
4266.081	0.179	1.914	2.050	14.59	0.175	1.874	2.008	14.52	0.164	1.752	1.880	14.13
4268.915	0.180	1.919	2.055	14.63	0.174	1.856	1.990	14.38	0.164	1.751	1.879	14.12
4276.836	0.181	1.928	2.064	14.69	0.174	1.855	1.989	14.37	0.164	1.749	1.877	14.11
4283.169	0.178	1.897	2.033	14.47	0.174	1.854	1.988	14.37	0.165	1.759	1.887	14.19
4284.838	0.180	1.914	2.050	14.59	0.173	1.842	1.976	14.28	0.164	1.747	1.875	14.10
4287.566	0.180	1.913	2.049	14.58	0.174	1.852	1.986	14.35	0.163	1.737	1.865	14.02
4288.310	0.180	1.913	2.049	14.58	0.174	1.851	1.985	14.34	0.164	1.747	1.875	14.10
4289.525	0.180	1.913	2.049	14.58	0.175	1.861	1.995	14.41	0.164	1.747	1.875	14.10
4290.377	0.178	1.893	2.029	14.44	0.174	1.851	1.985	14.34	0.164	1.747	1.875	14.10
4290.542	0.178	1.893	2.029	14.44	0.176	1.872	2.006	14.50	0.165	1.756	1.884	14.17
4291.630	0.179	1.903	2.039	14.51	0.175	1.862	1.996	14.43	0.165	1.756	1.884	14.17

λ	$\phi = 34°.2$				$\phi = 49°.4$				$\phi = 65°.0$				$\phi = 65°.0$*			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.125	1.371	1.486	12.76	0.095	1.049	1.138	12.42	0.057	0.646	0.704	11.83	0.050	0.569	0.627	10.53
4197.257	0.125	1.371	1.486	12.76	0.095	1.049	1.138	12.42	0.058	0.656	0.714	12.00	0.053	0.603	0.661	11.10
4203.730	0.126	1.381	1.496	12.84	0.097	1.068	1.157	12.62	0.058	0.655	0.713	11.98	0.055	0.625	0.683	11.47
4207.566	0.126	1.377	1.492	12.81	0.094	1.035	1.124	12.26	0.056	0.635	0.693	11.64	0.050	0.567	0.625	10.50
4216.136	0.126	1.374	1.489	12.78	0.096	1.053	1.142	12.46	0.059	0.660	0.718	12.06	0.050	0.565	0.623	10.47
4220.509	0.129	1.405	1.520	13.05	0.097	1.060	1.149	12.53	0.057	0.640	0.698	11.73	0.057	0.643	0.701	11.78
4232.887	0.127	1.379	1.494	12.82	0.097	1.058	1.147	12.51	0.058	0.649	0.707	11.87	0.056	0.630	0.688	11.56
4233.328	0.129	1.399	1.514	12.99	0.096	1.048	1.137	12.40	0.058	0.649	0.707	11.87	0.052	0.585	0.643	10.80
4257.815	0.130	1.400	1.515	13.00	0.098	1.063	1.152	12.57	0.058	0.645	0.703	11.81	0.057	0.637	0.695	11.68
4258.477	0.129	1.390	1.505	12.92	0.098	1.063	1.152	12.57	0.059	0.655	0.713	11.98	0.057	0.636	0.694	11.66
4265.418	0.129	1.389	1.504	12.91	0.097	1.047	1.136	12.39	0.058	0.643	0.701	11.78	0.053	0.590	0.648	10.88
4266.081	0.131	1.408	1.523	13.07	0.098	1.057	1.146	12.50	0.058	0.643	0.701	11.78	0.054	0.580	0.638	10.72
4268.915	0.130	1.394	1.509	12.95	0.098	1.056	1.145	12.49	0.060	0.664	0.722	12.13	0.057	0.635	0.693	11.64
4276.836	0.130	1.390	1.505	12.92	0.098	1.055	1.144	12.48	0.059	0.651	0.709	11.91	0.055	0.611	0.669	11.24
4283.169	0.131	1.400	1.515	13.00	0.099	1.065	1.154	12.59	0.060	0.661	0.719	12.08	0.060	0.665	0.723	11.15
4284.838	0.130	1.390	1.505	12.92	0.099	1.064	1.153	12.58	0.061	0.650	0.708	11.89	0.055	0.609	0.667	11.20
4287.566	0.130	1.390	1.505	12.92	0.097	1.044	1.133	12.36	0.058	0.640	0.698	11.73	0.057	0.630	0.688	11.56
4288.310	0.131	1.399	1.514	12.99	0.098	1.053	1.142	12.46	0.061	0.670	0.728	12.23	0.058	0.642	0.700	11.76
4289.525	0.131	1.399	1.514	12.99	0.099	1.063	1.152	12.57	0.060	0.660	0.718	12.06	0.061	0.675	0.733	12.31
4290.377	0.129	1.379	1.494	12.82	0.097	1.043	1.132	12.35	0.058	0.640	0.698	11.73	0.057	0.632	0.690	11.59
4290.542	0.132	1.409	1.524	13.08	0.099	1.063	1.152	12.57	0.060	0.660	0.718	12.06	0.060	0.665	0.723	12.15
4291.630	0.129	1.378	1.493	12.82	0.098	1.053	1.142	12.46	0.060	0.660	0.718	12.06	0.058	0.655	0.713	11.98

* Measured by A. on G.

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 163. 1908, Aug. 26, $11^h\ 55^m$ G. M. T. Measured by L. on T. Distance from Limb 1.1 mm. Quality, good.

		$p-P$	π	ϕ	η	$\sec\eta$
	°	°	°	°	°	
		−0.3				
⊙	153.3	24.1	25.0	65.0	17.0	1.046
⊙−☊	78.8	40.1	40.6	49.4	11.0	1.019
P	−19.8	55.5	55.8	34.2	8.6	1.011
D	7.1	70.7	70.9	19.1	7.5	1.009
Diameter	168.9 mm	79.0	79.1	10.9	7.2	1.008
Factor	1.013	85.8	85.8	4.2	7.1	1.008

λ	$\phi = 4^\circ.2$				$\phi = 10^\circ.9$				$\phi = 19^\circ.1$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.172	1.880	2.016	14.34	0.170	1.859	1.993	14.40	0.160	1.750	1.878	14.12
4197.257	0.172	1.880	2.016	14.34	0.170	1.859	1.993	14.40	0.160	1.750	1.878	14.12
4203.730	0.173	1.889	2.025	14.42	0.173	1.887	2.021	14.60	0.162	1.768	1.896	14.25
4207.566	0.173	1.885	2.021	14.38	0.172	1.874	2.008	14.51	0.162	1.765	1.893	14.23
4216.136	0.174	1.890	2.026	14.42	0.170	1.849	1.983	14.33	0.162	1.762	1.890	14.21
4220.509	0.177	1.922	2.058	14 65	0.174	1.888	2.022	14.61	0.163	1.765	1.893	14.23
4232.887	0.177	1.911	2.047	14.57	0.172	1.859	1.993	14.40	0.164	1.773	1.901	14.29
4233.328	0.176	1.901	2.037	14.50	0.174	1.880	2.014	14.55	0.164	1.773	1.901	14.29
4257.815	0.178	1.910	2.046	14.56	0.175	1.879	2.013	14.54	0.166	1.782	1.910	14.36
4258.477	0.178	1.910	2.046	14.56	0.174	1.869	2.003	14.47	0.165	1.773	1.901	14.29
4265.418	0.178	1.909	2.045	14.56	0.176	1.884	2.018	14.58	0.162	1.738	1.866	14.03
4266.081	0.179	1.915	2.051	14.60	0.175	1.874	2.008	14.51	0.165	1.762	1.890	14.21
4268.915	0.178	1.904	2.040	14.52	0.175	1.867	2.001	14.46	0.165	1.761	1.889	14.20
4276.836	0.180	1.917	2.053	14.61	0.175	1.865	1.999	14.45	0.164	1.750	1.878	14.12
4283.169	0.178	1.896	2.032	14.47	0.175	1.865	1.999	14.45	0.164	1.750	1.878	14.12
4284.838	0.180	1.915	2.051	14.60	0.176	1.874	2.008	14.51	0.164	1.748	1.876	14.10
4287.566	0.179	1.905	2.041	14.53	0.175	1.864	1.998	14.44	0.165	1.758	1.886	14.18
4288.310	0.178	1.895	2.031	14.46	0.175	1.864	1.998	14.44	0.164	1.748	1.876	14.10
4289.525	0.180	1.915	2.051	14.60	0.174	1.853	1.987	14.36	0.165	1.758	1.886	14.18
4290.377	0.179	1.905	2.041	14.53	0.175	1.863	1.997	14.43	0.164	1.748	1.876	14.10
4290.542	0.180	1.914	2.050	14.59	0.175	1.863	1.997	14.43	0.165	1.758	1.886	14.18
4291.630	0.180	1.914	2.050	14.59	0.174	1.852	1.986	14.35	0.164	1.747	1.875	14.09

λ	$\phi = 34^\circ.2$				$\phi = 49^\circ.4$				$\phi = 65^\circ.0$				$\phi = 65^\circ.0$*			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.131	1.441	1.556	13.36	0.094	1.038	1.127	12.30	0.056	0.634	0.692	11.63	0.050	0.569	0.627	10.53
4197.257	0.130	1.430	1.545	13.26	0.094	1.038	1.127	12.30	0.056	0.634	0.692	11.63	0.052	0.592	0.650	10.92
4203.730	0.132	1.443	1.558	13.37	0.096	1.058	1.147	12.52	0.057	0.643	0.701	11.78	0.054	0.612	0.670	11.26
4207.566	0.132	1.440	1.555	13.35	0.096	1.056	1.145	12.49	0.057	0.642	0.700	11.76	0.052	0.589	0.647	10.87
4216.136	0.131	1.429	1.544	13.25	0.095	1.044	1.133	12.36	0.056	0.630	0.688	11.56	0.052	0.588	0.646	10.85
4220.509	0.132	1.437	1.552	13.32	0.096	1.052	1.141	12.45	0.059	0.663	0.721	12.11	0.058	0.654	0.712	11.96
4232.887	0.132	1.435	1.550	13.30	0.099	1.081	1.170	12.77	0.058	0.650	0.708	11.89	0.055	0.618	0.676	11.36
4233.328	0.133	1.442	1.557	13.36	0.098	1.070	1.159	12.65	0.058	0.650	0.708	11.89	0.052	0.585	0.643	10 80
4257.815	0.133	1.433	1.548	13.29	0.099	1.074	1.163	12.69	0.060	0.666	0.724	12.16	0.055	0.615	0.673	11.31
4258.477	0.133	1.433	1.548	13.29	0.098	1.064	1.153	12.58	0.058	0.646	0.704	11.83	0.054	0.605	0.633	11.14
4265.418	0.134	1.435	1.550	13.30	0.096	1.042	1.131	12.34	0.060	0.666	0.724	12.16	0.056	0.624	0.682	11.46
4266.081	0.134	1.435	1.550	13.30	0.098	1.057	1.146	12.50	0.059	0.653	0.711	11.94	0.055	0.614	0.672	11.29
4268.915	0.135	1.444	1.559	13.38	0.098	1.056	1.145	12.49	0.059	0.652	0.710	11.92	0.056	0.623	0.681	11.44
4276.836	0.134	1.433	1.548	13.29	0.099	1.065	1.154	12.59	0.060	0.659	0.717	12.04	0.055	0.613	0.671	11.27
4283.169	0.132	1.412	1.527	13.10	0.099	1.065	1.154	12.59	0.058	0.639	0.697	11.71	0.057	0.631	0.689	11.57
4284.838	0.134	1.433	1.548	13.29	0.098	1.054	1.143	12.47	0.060	0.659	0.717	12.04	0.054	0.599	0.657	11.04
4287.566	0.134	1.433	1.548	13.29	0.100	1.075	1.164	12.70	0.059	0.649	0.707	11.88	0.055	0.609	0.667	11.20
4288.310	0.134	1.432	1.547	13.28	0.101	1.085	1.174	12.81	0.060	0.659	0.717	12.04	0.056	0.619	0.677	11.37
4289.525	0.134	1.431	1.546	13.27	0.099	1.064	1.153	12.58	0.058	0.639	0.697	11.71	0.056	0.619	0.677	11.37
4290.377	0.133	1.420	1.535	13.18	0.098	1.053	1.142	12.46	0.058	0.639	0.697	11.71	0.054	0.598	0.656	11.02
4290.542	0.134	1.431	1.546	13.27	0.101	1.085	1.174	12.81	0.060	0.659	0.717	12.04	0.056	0.619	0.677	11.37
4291.630	0.134	1.431	1.546	13.27	0.098	1.053	1.142	12.46	0.059	0.649	0.707	11.88	0.057	0.630	0.688	11.56

*Measured by A. on G.

TABLE II. — RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908 — Continued.

Plate ω 164. 1908, Aug. 26, $11^h\ 55^m$ G. M. T. Measured by L. on T. Distance from Limb 1.1 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		−0.3				
☉	153.3	24.1	25.0	65.0	17.0	1.046
☉ − ☊	78.8	40.1	40.6	49.4	11.0	1.019
P	−19.8	55.5	55.8	34.2	8.6	1.011
D	7.1	70.7	70.9	19.1	7.5	1.009
Diameter	168.9 mm	79.0	79.1	10.9	7.2	1.008
Factor	1.013	85.8	85.8	4.2	7.1	1.008

λ	$\phi = 4°.2$				$\phi = 10°.9$				$\phi = 19°.1$			
	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.169	1.848	1.984	14.12	0.169	1.858	1.992	14.40	0.159	1.739	1.867	14.04
4197.257	0.171	1.868	2.004	14.26	0.168	1.848	1.982	14.32	0.159	1.739	1.867	14.04
4203.730	0.173	1.885	2.021	14.38	0.170	1.853	1.987	14.36	0.161	1.752	1.880	14.13
4207.566	0.174	1.894	2.030	14.45	0.171	1.860	1.994	14.41	0.160	1.741	1.869	14.05
4216.136	0.174	1.890	2.026	14.42	0.170	1.848	1.982	14.32	0.159	1.729	1.857	13.97
4220.509	0.177	1.920	2.056	14.64	0.173	1.872	2.006	14.50	0.162	1.754	1.882	14.15
4232.887	0.176	1.901	2.037	14.50	0.172	1.859	1.993	14.41	0.162	1.752	1.880	14.13
4233.328	0.176	1.900	2.036	14.49	0.172	1.859	1.993	14.41	0.160	1.730	1.858	13.98
4257.815	0.178	1.898	2.034	14.48	0.174	1.867	2.001	14.46	0.162	1.741	1.869	14.05
4258.477	0.178	1.898	2.034	14.48	0.174	1.867	2.001	14.46	0.163	1.751	1.879	14.12
4265.418	0.177	1.895	2.031	14.46	0.175	1.874	2.008	14.51	0.161	1.726	1.854	13.94
4266.081	0.179	1.915	2.051	14.60	0.175	1.874	2.008	14.51	0.163	1.742	1.870	14.06
4268.915	0.178	1.898	2.034	14.48	0.174	1.861	1.995	14.42	0.163	1.741	1.869	14.05
4276.836	0.177	1.886	2.022	14.39	0.174	1.859	1.993	14.40	0.163	1.739	1.867	14.04
4283.169	0.178	1.896	2.032	14.46	0.175	1.863	1.997	14.44	0.164	1.749	1.877	14.11
4284.838	0.179	1.904	2.040	14.52	0.174	1.853	1.987	14.36	0.162	1.727	1.855	13.95
4287.566	0.178	1.894	2.030	14.45	0.175	1.862	1.996	14.43	0.162	1.726	1.854	13.94
4288.310	0.177	1.884	2.020	14.37	0.174	1.852	1.986	14.35	0.165	1.757	1.885	14.17
4289.525	0.178	1.893	2.029	14.44	0.176	1.872	2.006	14.50	0.164	1.747	1.875	14.10
4290.377	0.178	1.893	2.029	14.44	0.174	1.852	1.986	14.35	0.164	1.747	1.875	14.10
4290.542	0.178	1.893	2.029	14.44	0.176	1.872	2.006	14.50	0.164	1.747	1.875	14.10
4291.630	0.179	1.903	2.039	14.51	0.174	1.852	1.986	14.35	0.165	1.756	1.884	14.16
	$\phi = 34°.2$				$\phi = 49°.4$				$\phi = 65°.0$			
4196.699	0.130	1.425	1.540	13.22	0.096	1.059	1.148	12.53	0.055	0.624	0.682	11.46
4197.257	0.130	1.425	1.540	13.22	0.096	1.059	1.148	12.53	0.057	0.644	0.702	11.79
4203.730	0.133	1.455	1.570	13.48	0.097	1.064	1.153	12.58	0.058	0.654	0.712	11.96
4207.566	0.133	1.454	1.569	13.47	0.097	1.062	1.151	12.56	0.057	0.644	0.702	11.79
4216.136	0.131	1.426	1.541	13.23	0.096	1.050	1.139	12.43	0.056	0.630	0.688	11.56
4220.509	0.132	1.434	1.549	13.30	0.097	1.060	1.149	12.54	0.058	0.649	0.707	11.88
4232.887	0.133	1.441	1.556	13.36	0.096	1.048	1.137	12.40	0.057	0.638	0.696	11.69
4233.328	0.133	1.441	1.556	13.36	0.099	1.081	1.170	12.76	0.058	0.648	0.706	11.86
4257.815	0.136	1.460	1.575	13.52	....	....	....	....	....	....	....	....
4258.477	0.134	1.439	1.554	13.34	....	....	....	....	....	....	....	....
4265.418	0.135	1.449	1.564	13.43	0.099	1.072	1.161	12.66	0.058	0.643	0.701	11.77
4266.081	0.134	1.436	1.551	13.31	0.098	1.063	1.152	12.57	0.058	0.642	0.700	11.75
4268.915	0.135	1.444	1.559	13.38	0.099	1.071	1.160	12.65	0.058	0.639	0.697	11.71
4276.836	0.135	1.444	1.559	13.38	0.100	1.077	1.166	12.61	0.059	0.649	0.707	11.88
4283.169	0.134	1.432	1.547	13.28	0.100	1.077	1.166	12.61	0.058	0.639	0.697	11.71
4284.838	0.134	1.432	1.547	13.28	0.098	1.056	1.145	12.49	0.059	0.648	0.706	11.86
4287.566	0.133	1.431	1.546	13.27	0.098	1.055	1.144	12.48	0.058	0.638	0.696	11.69
4288.310	0.136	1.453	1.568	13.46	0.098	1.055	1.144	12.48	0.058	0.638	0.696	11.69
4289.525	0.135	1.442	1.557	13.36	0.099	1.065	1.154	12.59	0.059	0.648	0.706	11.86
4290.377	0.135	1.442	1.557	13.36	0.097	1.044	1.133	12.36	0.059	0.648	0.706	11.86
4290.542	0.137	1.462	1.577	13.54	0.100	1.074	1.163	12.69	0.059	0.648	0.706	11.86
4291.630	0.135	1.441	1.556	13.35	0.100	1.074	1.163	12.60	0.058	0.638	0.696	11.69

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 165. 1908, Aug. 27, $6^h\ 45^m$ G. M. T. Measured by L. on T. Distance from Limb 1.6 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		−0.2				
⊙	154.1	24.2	25.2	64.8	17.0	1.046
⊙−Ω	79.6	40.1	40.6	49.4	11.0	1.019
P	−20.1	55.6	55.9	34.1	8.6	1.011
D	7.1	70.8	70.9	19.1	7.5	1.009
Diameter	168.8 mm	78.3	78.4	11.6	7.3	1.008
Factor	1.019	85.8	85.8	4.2	7.1	1.008

λ	$\phi = 4.2°$				$\phi = 11.6°$				$\phi = 19.1°$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.169	1.861	1.997	14.22	0.169	1.858	1.992	14.43	0.158	1.738	1.867	14.03
4197.257	0.169	1.861	1.997	14.22	0.168	1.848	1.982	14.36	0.157	1.736	1.865	14.01
4203.730	0.172	1.887	2.023	14.40	0.170	1.864	1.998	14.48	0.160	1.756	1.885	14.16
4207.566	0.173	1.898	2.034	14.48	0.170	1.863	1.997	14.47	0.160	1.752	1.881	14.13
4216.136	0.173	1.883	2.019	14.37	0.171	1.868	2.002	14.52	0.160	1.750	1.879	14.11
4220.509	0.176	1.923	2.059	14.66	0.170	1.852	1.986	14.40	0.161	1.759	1.888	14.19
4232.887	0.175	1.905	2.041	14.53	0.172	1.870	2.004	14.53	0.161	1.763	1.892	14.22
4233.328	0.176	1.915	2.051	14.60	0.171	1.860	1.994	14.43	0.162	1.762	1.891	14.21
4257.815	0.178	1.922	2.058	14.65	0.173	1.870	2.004	14.53	0.163	1.761	1.890	14.20
4258.477	0.175	1.891	2.027	14.43	0.173	1.869	2.003	14.52	0.163	1.761	1.890	14.20
4265.418	0.176	1.896	2.032	14.47	0.172	1.854	1.988	14.41	0.163	1.758	1.887	14.18
4266.081	0.176	1.895	2.031	14.46	0.173	1.857	1.991	14.43	0.162	1.748	1.877	14.10
4268.915	0.178	1.916	2.052	14.61	0.174	1.866	2.000	14.50	0.163	1.756	1.885	14.16
4276.836	0.176	1.892	2.028	14.44	0.173	1.855	1.989	14.42	0.162	1.739	1.868	14.04
4283.169	0.178	1.907	2.043	14.54	0.174	1.865	1.999	14.49	0.163	1.748	1.877	14.10
4284.838	0.176	1.886	2.022	14.40	0.174	1.864	1.998	14.48	0.162	1 737	1.866	14.02
4287.566	0.177	1.898	2.034	14.48	0.172	1.844	1.978	14.34	0.164	1.757	1.886	14.17
4288.310	0.176	1.885	2.021	14.39	0.172	1.843	1.977	14.33	0.163	1.747	1.876	14.09
4289.525	0.178	1.905	2.041	14.53	0.174	1.864	1.998	14.48	0.163	1.747	1.876	14.09
4290.377	0.176	1.884	2.020	14.38	0.173	1.851	1.985	14.39	0.163	1.747	1.876	14.09
4290.542	0.177	1.894	2.030	14.45	0.172	1.841	1.975	14.31	0.164	1.757	1.886	14.17
4291.630	0.178	1.905	2.041	14.53	0.173	1.851	1.985	14.39	0.163	1.747	1.876	14.09

λ	$\phi = 34.1°$				$\phi = 49.4°$				$\phi = 64.8°$			
4196.699	0.131	1.444	1.558	13.36	0.095	1.054	1.143	12.47	0.054	0.611	0.669	11.15
4197.257	0.130	1.434	1.548	13.27	0.094	1.044	1.133	12.36	0.054	0.611	0.669	11.15
4203.730	0.131	1.443	1.557	13.35	0.094	1.042	1.131	12.34	0.055	0.632	0.690	11.51
4207.566	0.133	1.462	1.576	13.51	0.095	1.054	1.143	12.37	0.055	0.620	0.678	11.31
4216.136	0.132	1.446	1.560	13.37	0.094	1.039	1.128	12.31	0.055	0.618	0.676	11.27
4220.509	0.134	1.467	1.581	13.47	0.097	1.068	1.157	12.62	0.057	0.636	0.694	11.57
4232.887	0.132	1.441	1.555	13.33	0.096	1.054	1.143	12.37	0.056	0.625	0.683	11.39
4233.328	0.131	1.431	1.545	13.25	0.096	1.054	1.143	12.37	0.058	0.645	0.703	11.73
4257.815	0.133	1.443	1.557	13.35	0.097	1.058	1.147	12.51	0.057	0.628	0.686	11.44
4258.477	0.134	1.453	1.567	13.44	0.098	1.068	1.157	12.62	0.057	0.628	0.686	11.44
4265.418	0.134	1.438	1.552	13.30	0.097	1.052	1.141	12.45	0.058	0.637	0.695	11.59
4266.081	0.132	1.428	1.542	13.22	0.098	1.062	1.151	12.56	0.058	0.637	0.695	11.59
4268.915	0.133	1.438	1.552	13.30	0.097	1.052	1.141	12.45	0.058	0.637	0.695	11.59
4276.836	0.134	1.443	1.557	13.35	0.096	1.041	1.130	12.33	0.057	0.627	0.685	11.42
4283.169	0.134	1.441	1.555	13.33	0.096	1.041	1.130	12.33	0.057	0.627	0.685	11.42
4284.838	0.133	1.430	1.544	13.24	0.097	1.050	1.139	12.43	0.058	0.636	0.694	11.57
4287.566	0.134	1.440	1.554	13.32	0.098	1.060	1.149	12.54	0.057	0.626	0.684	11.40
4288.310	0.135	1.450	1.564	13.41	0.098	1.060	1.149	12.54	0.058	0.636	0.694	11.57
4289.525	0.135	1.450	1.564	13.41	0.097	1.050	1.139	12.43	0.059	0.646	0.704	11.75
4290.377	0.135	1.449	1.563	13.40	0.098	1.059	1.148	12.53	0.058	0.636	0.694	11.57
4290.542	0.134	1.439	1.553	13.31	0.097	1.049	1.138	12.43	0.058	0.636	0.694	11.57
4291.630	0.134	1.439	1.553	13.31	0.098	1.059	1.148	12.53	0.058	0.636	0.694	11.57

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 166. 1908, Aug. 27, $6^h 45^m$ G. M. T. Measured by L. on T. Distance from Limb 1.6 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		−0.2				
⊙	154.1	24.2	25.2	64.8	17.0	1.046
⊙−☊	79.6	40.1	40.6	49.4	11.0	1.019
P	−20.1	55.6	55.9	34.1	8.6	1.011
D	7.1	70.8	70.9	19.1	7.5	1.009
Diameter	168.8 mm	78.3	78.4	11.6	7.3	1.008
Factor	1.019	85.8	85.8	4.2	7.1	1.008

λ	$\phi = 4°.2$				$\phi = 11°.6$				$\phi = 19°.1$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.172	1.892	2.028	14.44	0.168	1.847	1.981	14.36	0.158	1.738	1.867	14.03
4197.257	0.174	1.912	2.048	14.58	0.168	1.847	1.981	14.36	0.158	1.738	1.867	14.03
4203.730	0.173	1.898	2.034	14.48	0.169	1.853	1.987	14.40	0.159	1.745	1.874	14.08
4207.566	0.176	1.930	2.066	14.71	0.169	1.852	1.986	14.39	0.160	1.751	1.880	14.12
4216.136	0.176	1.925	2.061	14.67	0.168	1.837	1.971	14.29	0.160	1.749	1.878	14.10
4220.509	0.178	1.944	2.080	14.81	0.171	1.861	1.995	14.46	0.160	1.748	1.877	14.09
4232.887	0.178	1.936	2.072	14.75	0.169	1.839	1.973	14.30	0.161	1.752	1.881	14.13
4233.328	0.178	1.936	2.072	14.75	0.172	1.869	2.003	14.52	0.162	1.761	1.890	14.20
4257.815	0.179	1.933	2.069	14.73	0.171	1.849	1.983	14.37	0.162	1.750	1.879	14.11
4258.477	0.177	1.913	2.049	14.59	0.173	1.868	2.002	14.51	0.162	1.750	1.879	14.11
4265.418	0.177	1.907	2.043	14.55	0.173	1.863	1.997	14.47	0.161	1.737	1.866	14.02
4266.081	0.178	1.916	2.052	14.62	0.172	1.846	1.980	14.35	0.162	1.747	1.876	14.09
4268.915	0.178	1.916	2.052	14.62	0.172	1.845	1.979	14.34	0.162	1.745	1.874	14.07
4276.836	0.178	1.913	2.049	14.59	0.173	1.854	1.988	14.41	0.161	1.729	1.858	13.96
4283.169	0.177	1.898	2.034	14.48	0.172	1.844	1.978	14.33	0.162	1.738	1.867	14.03
4284.838	0.176	1.886	2.022	14.39	0.171	1.833	1.967	14.26	0.162	1.737	1.866	14.02
4287.566	0.177	1.898	2.034	14.48	0.173	1.853	1.987	14.40	0.162	1.737	1.866	14.02
4288.310	0.179	1.916	2.052	14.61	0.172	1.842	1.976	14.32	0.163	1.747	1.876	14.09
4289.525	0.178	1.906	2.042	14.54	0.174	1.863	1.997	14.47	0.163	1.747	1.876	14.09
4290.377	0.178	1.905	2.041	14.53	0.173	1.851	1.985	14.39	0.162	1.737	1.866	14.02
4290.542	0.179	1.915	2.051	14.60	0.172	1.841	1.975	14.28	0.163	1.747	1.876	14.09
4291.630	0.176	1.885	2.021	14.38	0.173	1.851	1.985	14.39	0.164	1.756	1.885	14.15

λ	$\phi = 34°.1$				$\phi = 49°.4$				$\phi = 64°.8$			
4196.699	0.130	1.434	1.548	13.27	0.096	1.065	1.154	12.59	0.055	0.622	0.680	11.34
4197.257	0.129	1.424	1.538	13.19	0.094	1.045	1.134	12.37	0.054	0.612	0.670	11.17
4203.730	0.132	1.451	1.565	13.42	0.096	1.064	1.153	12.58	0.056	0.628	0.686	11.42
4207.566	0.131	1.441	1.555	13.33	0.098	1.086	1.175	12.82	0.057	0.637	0.695	11.58
4216.136	0.130	1.426	1.540	13.20	0.096	1.060	1.149	12.54	0.057	0.636	0.694	11.57
4220.509	0.134	1.468	1.582	13.57	0.096	1.059	1.148	12.52	0.058	0.646	0.704	11.74
4232.887	0.133	1.451	1.565	13.42	0.097	1.065	1.154	12.59	0.057	0.635	0.693	11.56
4233.328	0.134	1.462	1.576	13.51	0.096	1.055	1.144	12.48	0.056	0.625	0.683	11.38
4257.815	0.134	1.453	1.567	13.44	0.098	1.069	1.158	12.63	0.058	0.638	0.696	11.59
4258.477	0.136	1.474	1.588	13.62	0.098	1.069	1.158	12.63	0.058	0.638	0.696	11.59
4265.418	0.135	1.458	1.572	13.47	0.097	1.053	1.142	12.46	0.057	0.627	0.685	11.40
4266.081	0.134	1.448	1.562	13.38	0.097	1.053	1.142	12.46	0.058	0.637	0.695	11.58
4268.915	0.135	1.458	1.572	13.47	0.098	1.063	1.152	12.57	0.058	0.637	0.695	11.58
4276.836	0.134	1.443	1.557	13.34	0.098	1.062	1.151	12.56	0.057	0.627	0.685	11.40
4283.169	0.134	1.441	1.555	13.33	0.098	1.062	1.151	12.56	0.058	0.637	0.695	11.58
4284.838	0.135	1.451	1.565	13.42	0.098	1.061	1.150	12.55	0.059	0.646	0.704	11.74
4287.566	0.134	1.440	1.554	13.32	0.098	1.061	1.150	12.55	0.057	0.626	0.684	11.39
4288.310	0.134	1.440	1.554	13.32	0.097	1.051	1.140	12.44	0.058	0.636	0.694	11.57
4289.525	0.135	1.450	1.564	13.41	0.098	1.061	1.150	12.55	0.059	0.646	0.704	11.74
4290.377	0.134	1.439	1.553	13.31	0.098	1.060	1.149	12.54	0.057	0.626	0.684	11.39
4290.542	0.134	1.439	1.553	13.31	0.098	1.060	1.149	12.54	0.058	0.636	0.694	11.57
4291.630	0.135	1.449	1.563	13.40	0.099	1.070	1.159	12.65	0.058	0.636	0.694	11.57

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plates ω 179 and ω 180. 1908, Sept. 30, 11^{h} 40^{m} G. M. T. Measured by L. on T. Distance from Limb 1.0 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η		
☉	187.4°	29.2°	29.9°	60.1°	13.5°	1.028	D	6.7
☉−☊	112.9						Diameter	170.6 mm
P	−26.2						Factor	1.012

λ	$\phi = 60.1°$ Δ	v	$v+v_1$	ξ	$\phi = 60.1°$ Δ	v	$v+v_1$	ξ	$\phi = 60.1°$ Δ	v	$v+v_1$	ξ	$\phi = 60.1°$ Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.070	0.779	0.852	12.14	0.070	0.779	0.852	12.14	0.064	0.718	0.791	11.27	0.065	0.728	0.801	11.41
4197.257	0.070	0.779	0.852	12.14	0.070	0.779	0.852	12.14	0.065	0.728	0.801	11.41	0.065	0.728	0.801	11.41
4203.730	0.070	0.778	0.851	12.12	0.070	0.779	0.852	12.14	0.065	0.726	0.799	11.38	0.065	0.727	0.800	11.40
4207.566	0.072	0.797	0.870	12.39	0.071	0.787	0.860	12.25	0.065	0.725	0.798	11.37	0.066	0.735	0.808	11.51
4216.136	0.071	0.786	0.859	12.24	0.070	0.776	0.849	12.09	0.064	0.714	0.787	11.21	0.065	0.723	0.796	11.34
4220.509	0.072	0.795	0.868	12.36	0.072	0.795	0.868	12.37	0.066	0.732	0.805	11.47	0.067	0.741	0.814	11.59
4232.887	0.072	0.793	0.866	12.33	0.072	0.794	0.867	12.35	0.065	0.720	0.793	11.29	0.065	0.720	0.793	11.29
4233.328	0.072	0.793	0.866	12.33	0.073	0.803	0.876	12.48	0.066	0.730	0.803	11.44	0.066	0.730	0.803	11.44
4257.815	0.074	0.808	0.881	12.55	0.074	0.808	0.881	12.55	0.068	0.746	0.819	11.67	0.067	0.735	0.808	11.51
4258.477	0.072	0.788	0.861	12.26	0.072	0.788	0.861	12.26	0.067	0.736	0.809	11.52	0.067	0.735	0.808	11.51
4265.418	0.072	0.787	0.860	12.25	0.073	0.798	0.871	12.40	0.068	0.744	0.817	11.64	0.067	0.734	0.807	11.49
4266.081	0.073	0.797	0.870	12.39	0.074	0.808	0.881	12.55	0.068	0.744	0.817	11.64	0.069	0.754	0.827	11.78
4268.915	0.072	0.787	0.860	12.25	0.074	0.807	0.880	12.53	0.068	0.744	0.817	11.64	0.067	0.734	0.807	11.49
4276.836	0.074	0.805	0.878	12.51	0.074	0.806	0.879	12.52	0.067	0.733	0.806	11.48	0.068	0.743	0.816	11.62
4283.169	0.072	0.783	0.856	12.19	0.073	0.794	0.867	12.35	0.067	0.732	0.805	11.47	0.067	0.733	0.806	11.48
4284.838	0.072	0.783	0.856	12.19	0.074	0.804	0.877	12.49	0.068	0.742	0.815	11.61	0.067	0.733	0.806	11.48
4287.566	0.073	0.792	0.865	12.35	0.074	0.803	0.876	12.48	0.068	0.742	0.815	11.61	0.068	0.742	0.815	11.61
4288.310	0.074	0.802	0.875	12.47	0.073	0.793	0.866	12.34	0.068	0.742	0.815	11.61	0.067	0.732	0.805	11.47
4289.525	0.074	0.802	0.875	12.47	0.074	0.803	0.876	12.48	0.069	0.752	0.825	11.75	0.068	0.742	0.815	11.61
4290.377	0.073	0.792	0.865	12.32	0.072	0.783	0.856	12.20	0.068	0.742	0.815	11.61	0.067	0.732	0.805	11.47
4290.542	0.073	0.792	0.865	12.32	0.073	0.793	0.866	12.34	0.067	0.730	0.803	11.44	0.069	0.752	0.825	11.75
4291.630	0.074	0.802	0.875	12.47	0.073	0.793	0.866	12.34	0.068	0.740	0.813	11.59	0.071	0.772	0.845	12.04

Plate ω 182. 1908, Oct. 9, 11^{h} 0^{m} G. M. T. Measured by L. on T. Distance from Limb 1.0 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η		
	°	°	°	°	°			
		−0.1						
☉	196.2	55.9	56.1	33.9	7.4	1.008	D	6.1
☉−☊	121.7	70.9	71.0	19.0	6.5	1.006	Diameter	172.6 mm
P	−26.5	78.9	79.0	11.0	6.3	1.006	Factor	1.012

λ	$\phi = 11.0°$ Δ	v	$v+v_1$	ξ	$\phi = 11.0°$ Δ	v	$v+v_1$	ξ	$\phi = 19.0°$ Δ	v	$v+v_1$	ξ	$\phi = 33.9°$ Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.169	1.843	1.981	14.33	0.169	1.843	1.981	14.33	0.157	1.711	1.845	13.85	0.125	1.365	1.485	12.70
4197.257	0.170	1.852	1.990	14.39	0.170	1.852	1.990	14.39	0.158	1.721	1.855	13.93	0.125	1.365	1.485	12.70
4203.730	0.171	1.861	1.999	14.46	0.172	1.872	2.009	14.53	0.157	1.705	1.839	13.81	0.127	1.384	1.504	12.86
4207.566	0.172	1.869	2.007	14.52	0.172	1.865	2.002	14.48	0.160	1.731	1.865	14.00	0.127	1.382	1.502	12.85
4216.136	0.172	1.860	1.998	14.45	0.171	1.852	1.990	14.39	0.159	1.718	1.852	13.91	0.126	1.367	1.487	12.72
4220.509	0.172	1.858	1.996	14.44	0.172	1.856	1.994	14.42	0.160	1.725	1.860	13.97	0.126	1.366	1.486	12.71
4232.887	0.173	1.865	2.003	14.49	0.173	1.863	2.001	14.47	0.160	1.724	1.859	13.96	0.128	1.381	1.501	12.84
4233.328	0.173	1.865	2.003	14.49	0.172	1.853	1.991	14.40	0.161	1.734	1.868	14.03	0.126	1.360	1.480	12.66
4257.815	0.175	1.874	2.012	14.55	0.172	1.843	1.981	14.33	0.160	1.712	1.846	13.86	0.128	1.372	1.492	12.77
4258.477	0.174	1.863	2.001	14.47	0.174	1.862	2.000	14.46	0.160	1.712	1.846	13.86	0.127	1.362	1.482	12.68
4265.418	0.174	1.859	1.997	14.44	0.173	1.848	1.986	14.36	0.159	1.697	1.831	13.75	0.127	1.361	1.481	12.67
4266.081	0.174	1.859	1.997	14.44	0.174	1.859	1.997	14.44	0.161	1.715	1.849	13.88	0.129	1.380	1.500	12.83
4268.915	0.174	1.855	1.993	14.41	0.174	1.856	1.994	14.42	0.161	1.714	1.848	13.88	0.126	1.347	1.467	12.55
4276.836	0.173	1.843	1.981	14.33	0.173	1.843	1.981	14.33	0.159	1.693	1.827	13.72	0.126	1.345	1.465	12.53
4283.169	0.173	1.838	1.976	14.29	0.174	1.848	1.986	14.36	0.159	1.689	1.823	13.69	0.127	1.352	1.472	12.59
4284.838	0.174	1.848	1.986	14.36	0.173	1.837	1.975	14.28	0.160	1.699	1.833	13.76	0.127	1.352	1.472	12.59
4287.566	0.174	1.847	1.985	14.35	0.175	1.857	1.995	14.42	0.160	1.698	1.832	13.76	0.127	1.351	1.471	12.58
4288.310	0.174	1.847	1.985	14.35	0.174	1.847	1.985	14.35	0.160	1.698	1.832	13.76	0.127	1.351	1.471	12.58
4289.525	0.173	1.836	1.974	14.28	0.175	1.856	1.994	14.41	0.160	1.698	1.832	13.76	0.128	1.361	1.481	12.67
4290.377	0.173	1.836	1.974	14.28	0.175	1.856	1.994	14.41	0.159	1.688	1.822	13.68	0.128	1.361	1.481	12.67
4290.542	0.174	1.846	1.984	14.35	0.175	1.856	1.994	14.41	0.159	1.688	1.822	13.68	0.128	1.361	1.481	12.67
4291.630	0.172	1.825	1.963	14.20	0.175	1.856	1.994	14.41	0.157	1.718	1.852	13.91	0.128	1.361	1.481	12.67

TABLE II. — RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908 — Continued.

Plate ω 183. 1908, Oct. 9, 11^h 0^m G. M. T. Measured by L. on T. Distance from Limb 1.0 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		−0.1				
☉	196.2	55.9	56.1	33.9	7.4	1.008
☉−☊	121.7	70.9	71.0	19.0	6.5	1.006
P	−26.5	78.9	79.0	11.0	6.3	1.006
D	6.1					
Diameter	172.6 mm					
Factor	1.012					

λ	$\phi = 11.°0$				$\phi = 11.°0$				$\phi = 19.°0$				$\phi = 19.°0$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.170	1.851	1.989	14.38	0.170	1.851	1.989	14.38	0.158	1.722	1.856	13.94	0.158	1.722	1.856	13.94
4197.257	0.169	1.841	1.979	14.31	0.170	1.851	1.989	14.38	0.158	1.722	1.856	13.94	0.158	1.722	1.856	13.94
4203.730	0.172	1.870	2.008	14.52	0.173	1.878	2.016	14.58	0.160	1.741	1.875	14.08	0.159	1.729	1.863	13.99
4207.566	0.171	1.854	1.992	14.41	0.171	1.854	1.992	14.41	0.161	1.749	1.883	14.14	0.160	1.738	1.872	14.06
4216.136	0.171	1.851	1.989	14.38	0.171	1.851	1.989	14.38	0.159	1.726	1.860	13.97	0.160	1.734	1.868	14.03
4220.509	0.172	1.855	1.993	14.41	0.174	1.878	2.016	14.58	0.160	1.734	1.868	14.03	0.160	1.732	1.866	14.01
4232.887	0.171	1.842	1.980	14.32	0.174	1.875	2.013	14.56	0.162	1.745	1.879	14.11	0.160	1.725	1.859	13.96
4233.328	0.172	1.852	1.990	14.39	0.173	1.864	2.002	14.48	0.161	1.735	1.869	14.03	0.161	1.735	1.869	14.03
4257.815	0.174	1.862	2.000	14.46	0.174	1.861	1.999	14.46	0.164	1.755	1.889	14.18	0.162	1.734	1.868	14.02
4258.477	0.174	1.861	1.999	14.46	0.174	1.861	1.999	14.46	0.161	1.724	1.858	13.95	0.161	1.724	1.858	13.95
4265.418	0.174	1.857	1.995	14.43	0.174	1.857	1.995	14.43	0.161	1.721	1.855	13.93	0.161	1.724	1.858	13.95
4266.081	0.175	1.867	2.005	14.50	0.173	1.846	1.984	14.45	0.162	1.730	1.864	14.00	0.162	1.734	1.868	14.02
4268.915	0.174	1.855	1.993	14.41	0.174	1.855	1.993	14.41	0.162	1.729	1.863	13.99	0.162	1.729	1.863	13.99
4276.836	0.174	1.862	2.000	14.46	0.175	1.863	2.001	14.47	0.162	1.726	1.860	13.97	0.161	1.716	1.850	13.90
4283.169	0.174	1.848	1.986	14.37	0.176	1.867	2.005	14.50	0.163	1.731	1.865	14.00	0.162	1.721	1.855	13.93
4284.838	0.174	1.847	1.985	14.36	0.175	1.857	1.995	14.43	0.162	1.721	1.855	13.93	0.162	1.721	1.855	13.93
4287.566	0.174	1.846	1.984	14.35	0.175	1.856	1.994	14.42	0.163	1.731	1.865	14.00	0.161	1.710	1.844	13.85
4288.310	0.174	1.846	1.984	14.35	0.174	1.846	1.984	14.35	0.162	1.720	1.854	13.92	0.162	1.720	1.854	13.92
4289.525	0.175	1.855	1.993	14.41	0.175	1.855	1.993	14.41	0.162	1.719	1.853	13.91	0.162	1.719	1.853	13.92
4290.377	0.173	1.835	1.973	14.27	0.175	1.855	1.993	14.41	0.162	1.719	1.853	13.91	0.161	1.709	1.843	13.84
4290.542	0.175	1.855	1.993	14.41	0.176	1.865	2.003	14.48	0.164	1.739	1.873	14.06	0.162	1.719	1.853	13.91
4291.630	0.175	1.855	1.993	14.41	0.715	1.855	1.993	14.41	0.162	1.719	1.853	13.91	0.162	1.719	1.853	13.91

λ	$\phi = 19.°0$				$\phi = 33.°9$				$\phi = 33.°9$				$\phi = 33.°9$			
4196.699	0.159	1.732	1.866	14.01	0.131	1.431	1.551	13.27	0.130	1.420	1.540	13.17	0.129	1.411	1.531	13.10
4197.257	0.159	1.732	1.866	14.01	0.131	1.431	1.551	13.27	0.130	1.420	1.540	13.17	0.130	1.420	1.540	13.17
4203.730	0.160	1.741	1.875	14.08	0.132	1.439	1.559	13.33	0.132	1.438	1.558	13.33	0.131	1.428	1.548	13.24
4207.566	0.160	1.738	1.872	14.06	0.132	1.437	1.557	13.32	0.132	1.437	1.557	13.32	0.131	1.425	1.545	13.22
4216.136	0.160	1.735	1.869	14.03	0.131	1.419	1.539	13.16	0.130	1.416	1.536	13.14	0.131	1.423	1.543	13.20
4220.509	0.160	1.732	1.866	14.01	0.131	1.418	1.538	13.16	0.132	1.432	1.552	13.28	0.132	1.432	1.552	13.28
4232.887	0.161	1.736	1.870	14.04	0.132	1.426	1.546	13.22	0.134	1.446	1.566	13.39	0.132	1.429	1.549	13.25
4233.328	0.160	1.724	1.858	13.95	0.132	1.426	1.546	13.22	0.133	1.436	1.556	13.31	0.134	1.447	1.567	13.40
4257.815	0.161	1.724	1.858	13.95	0.135	1.449	1.569	13.42	0.135	1.449	1.569	13.41	0.134	1.437	1.557	13.32
4258.477	0.162	1.734	1.868	14.03	0.134	1.438	1.558	13.33	0.134	1.438	1.558	13.33	0.132	1.417	1.537	13.15
4265.418	0.161	1.721	1.855	13.93	0.132	1.413	1.533	13.11	0.133	1.424	1.544	13.21	0.133	1.424	1.544	13.21
4266.081	0.162	1.731	1.865	14.00	0.133	1.423	1.543	13.20	0.134	1.434	1.554	13.29	0.133	1.424	1.544	13.21
4268.915	0.162	1.727	1.861	13.97	0.134	1.432	1.552	13.28	0.135	1.444	1.564	13.38	0.134	1.432	1.552	13.27
4276.836	0.116	1.715	1.849	13.89	0.134	1.431	1.551	13.27	0.134	1.431	1.551	13.27	0.133	1.420	1.540	13.17
4283.169	0.126	1.721	1.855	13.93	0.134	1.427	1.547	13.23	0.134	1.426	1.546	13.22	0.133	1.417	1.537	13.15
4284.838	0.161	1.711	1.845	13.85	0.134	1.427	1.547	13.23	0.134	1.426	1.546	13.22	0.132	1.407	1.527	13.06
4287.566	0.161	1.711	1.845	13.85	0.134	1.426	1.546	13.22	0.133	1.415	1.535	13.13	0.134	1.429	1.549	13.25
4288.310	0.162	1.720	1.854	13.92	0.134	1.425	1.545	13.22	0.133	1.415	1.535	13.13	0.133	1.419	1.539	13.16
4289.525	0.162	1.719	1.853	13.91	0.135	1.435	1.555	13.30	0.133	1.415	1.535	13.13	0.134	1.429	1.549	13.25
4290.377	0.161	1.709	1.843	13.84	0.135	1.435	1.555	13.30	0.135	1.435	1.555	13.30	0.133	1.419	1.539	13.16
4290.542	0.162	1.719	1.853	13.91	0.134	1.425	1.545	13.22	0.135	1.435	1.555	13.30	0.134	1.429	1.549	13.25
4291.630	0.163	1.729	1.863	13.99	0.135	1.435	1.555	13.30	0.134	1.425	1.545	13.22	0.136	1.446	1.566	13.39

TABLE 11.—RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908—Continued.

Plate ω 184. 1908, Oct. 22, 6^h 30^m G. M. T. Measured by L. on T. Distance from Limb 1.3 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		0.0				
⊙	209.0	24.0	24.5	65.5	12.5	1.024
⊙−Ω	134.5	29.3	29.7	60.3	10.5	1.017
P	−25.9	39.7	40.0	50.0	8.1	1.010
D	5.1	86.0	86.0	4.0	5.2	1.004
Diameter	171.2 mm					
Factor	1.015					

λ	$\phi = 4.°0$				$\phi = 50.°0$				$\phi = 50.°0$			
	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.176	1.920	2.060	14.66	0.092	1.010	1.109	12.25	0.093	1.020	1.119	12.36
4197.257	0.176	1.920	2.060	14.66	0.092	1.010	1.109	12.25	0.093	1.020	1.119	12.36
4203.730	0.176	1.915	2.055	14.62	0.093	1.017	1.116	12.33	0.094	1.030	1.129	12.47
4207.566	0.177	1.924	2.064	14.69	0.093	1.015	1.114	12.30	0.094	1.028	1.127	12.45
4216.136	0.177	1.919	2.059	14.65	0.092	1.004	1.103	12.18	0.094	1.023	1.122	12.39
4220.509	0.178	1.928	2.068	14.72	0.094	1.023	1.122	12.39	0.095	1.032	1.131	12.49
4232.887	0.178	1.921	2.061	14.67	0.094	1.020	1.119	12.36	0.094	1.020	1.119	12.36
4233.328	0.180	1.941	2.081	14.81	0.095	1.030	1.129	12.47	0.095	1.030	1.129	12.47
4257.815	0.180	1.928	2.068	14.72	0.094	1.013	1.112	12.28	0.097	1.043	1.142	12.61
4258.477	0.179	1.918	2.058	14.65	0.095	1.023	1.122	12.39	0.095	1.022	1.121	12.38
4265.418	0.179	1.914	2.054	14.62	0.094	1.012	1.111	12.27	0.094	1.011	1.110	12.26
4266.081	0.181	1.934	2.074	14.76	0.096	1.032	1.131	12.49	0.095	1.021	1.120	12.37
4268.915	0.180	1.921	2.061	14.67	0.094	1.009	1.108	12.24	0.096	1.030	1.129	12.47
4276.836	0.180	1.919	2.059	14.65	0.094	1.008	1.107	12.23	0.096	1.029	1.128	12.46
4283.169	0.180	1.913	2.053	14.61	0.095	1.016	1.115	12.32	0.097	1.036	1.135	12.54
4284.838	0.180	1.913	2.053	14.61	0.095	1.016	1.115	12.32	0.097	1.036	1.135	12.54
4287.566	0.180	1.912	2.052	14.60	0.094	1.005	1.104	12.19	0.096	1.026	1.125	12.43
4288.310	0.179	1.902	2.042	14.53	0.095	1.015	1.114	12.30	0.097	1.036	1.135	12.54
4289.525	0.180	1.912	2.052	14.60	0.097	1.036	1.135	12.54	0.098	1.046	1.145	12.65
4290.377	0.180	1.912	2.052	14.60	0.094	1.005	1.104	12.19	0.096	1.025	1.124	12.41
4290.542	0.180	1.912	2.052	14.60	0.095	1.015	1.114	12.30	0.098	1.046	1.145	12.65
4291.630	0.181	1.922	2.062	14.67	0.095	1.015	1.114	12.30	0.097	1.035	1.134	12.52

λ	$\phi = 60.°3$				$\phi = 60.°3$				$\phi = 65.°5$				$\phi = 65.°5$			
	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ	Δ	v	$v + v_1$	ξ
		km	km	°		km	km	°		km	km	°		km	km	°
4196.699	0.065	0.719	0.799	11.45	0.066	0.729	0.809	11.59	0.053	0.589	0.657	11.25	0.053	0.588	0.656	11.23
4197.257	0.066	0.729	0.809	11.59	0.066	0.729	0.809	11.59	0.054	0.600	0.668	11.44	0.053	0.588	0.656	11.23
4203.730	0.068	0.750	0.830	11.89	0.067	0.739	0.819	11.74	0.053	0.588	0.656	11.57	0.054	0.598	0.666	11.40
4207.566	0.068	0.749	0.829	11.88	0.067	0.739	0.819	11.74	0.054	0.598	0.666	11.40	0.054	0.597	0.665	11.38
4216.136	0.067	0.738	0.818	11.72	0.066	0.728	0.808	11.58	0.053	0.586	0.654	11.20	0.053	0.585	0.653	11.18
4220.509	0.068	0.746	0.826	11.84	0.068	0.746	0.826	11.84	0.053	0.584	0.652	11.16	0.053	0.584	0.652	11.16
4232.887	0.069	0.754	0.834	11.95	0.067	0.734	0.814	11.66	0.055	0.605	0.673	11.52	0.053	0.583	0.651	11.14
4233.328	0.068	0.744	0.824	11.81	0.070	0.764	0.844	12.09	0.054	0.593	0.661	11.32	0.054	0.593	0.661	11.32
4257.815	0.068	0.739	0.819	11.74	0.070	0.758	0.838	12.01	0.055	0.600	0.668	11.44	0.055	0.601	0.669	11.45
4258.477	0.068	0.739	0.819	11.74	0.069	0.748	0.828	11.86	0.055	0.600	0.668	11.44	0.055	0.601	0.669	11.45
4265.418	0.069	0.748	0.828	11.86	0.070	0.758	0.838	12.01	0.053	0.578	0.646	11.06	0.055	0.600	0.668	11.44
4266.081	0.069	0.748	0.828	11.86	0.069	0.748	0.828	11.86	0.057	0.622	0.690	11.81	0.056	0.610	0.678	11.61
4268.915	0.069	0.746	0.826	11.84	0.070	0.757	0.837	11.99	0.056	0.610	0.678	11.61	0.056	0.609	0.677	11.59
4276.836	0.068	0.734	0.814	11.86	0.071	0.766	0.846	12.12	0.056	0.609	0.677	11.59	0.054	0.587	0.655	11.21
4283.169	0.069	0.743	0.823	11.79	0.068	0.733	0.813	11.65	0.056	0.607	0.675	11.56	0.054	0.586	0.654	11.20
4284.838	0.070	0.754	0.834	11.95	0.069	0.743	0.823	11.79	0.055	0.597	0.665	11.61	0.054	0.586	0.654	11.54
4287.566	0.068	0.734	0.814	11.66	0.069	0.743	0.823	11.79	0.055	0.596	0.664	11.37	0.055	0.596	0.664	11.54
4288.310	0.067	0.723	0.803	11.51	0.070	0.753	0.833	11.94	0.056	0.606	0.674	11.54	0.055	0.596	0.664	11.37
4289.525	0.070	0.753	0.833	11.94	0.070	0.753	0.833	11.94	0.056	0.606	0.674	11.54	0.057	0.617	0.685	11.73
4290.377	0.070	0.753	0.833	11.94	0.069	0.742	0.822	11.78	0.056	0.606	0.674	11.54	0.054	0.585	0.653	11.18
4290.542	0.070	0.753	0.833	11.94	0.071	0.763	0.843	12.08	0.057	0.616	0.684	11.71	0.056	0.606	0.674	11.54
4291.630	0.069	0.743	0.823	11.79	0.070	0.753	0.833	11.94	0.056	0.606	0.674	11.54	0.055	0.595	0.663	11.35

Table 11. — Results for Individual Plates. Observations of 1908 — Continued.

Plate ω 185. 1908, Oct. 22, 6^h 30^m G. M. T. Measured by L. on T. Distance from Limb 1.3 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		0.0				
⊙	209.0	24.0	24.5	65.5	12.5	1.024
⊙−☊	134.5	39.7	40.0	50.0	8.1	1.010
P	−25.9	86.0	86.0	4.0	5.2	1.004
D	5.1					
Diameter	171.2 mm					
Factor	1.015					

λ	$\phi = 4.0°$				$\phi = 50.0°$				$\phi = 50.0°$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.176	1.920	2.060	14.66	0.091	0.999	1.098	12.13	0.091	0.999	1.098	12.13
4197.257	0.176	1.920	2.060	14.66	0.091	0.999	1.098	12.13	0.091	0.999	1.098	12.13
4203.730	0.177	1.926	2.066	14.70	0.092	1.008	1.107	12.23	0.092	1.008	1.107	12.23
4207.566	0.177	1.924	2.064	14.69	0.092	1.006	1.105	12.21	0.092	1.007	1.106	12.22
4216.136	0.177	1.921	2.061	14.67	0.092	1.004	1.103	12.18	0.092	1.005	1.104	12.19
4220.509	0.178	1.928	2.068	14.72	0.093	1.011	1.110	12.26	0.092	1.003	1.102	12.17
4232.887	0.178	1.921	2.061	14.67	0.092	0.999	1.098	12.13	0.094	1.015	1.114	12.30
4233.328	0.180	1.941	2.081	14.81	0.093	1.009	1.108	12.24	0.094	1.015	1.114	12.30
4257.815	0.180	1.929	2.069	14.72	0.094	1.013	1.112	12.28	0.093	1.003	1.102	12.17
4258.477	0.180	1.928	2.068	14.72	0.092	0.992	1.091	12.05	0.093	1.003	1.102	12.17
4265.418	0.179	1.914	2.054	14.62	0.094	1.010	1.109	12.25	0.094	1.010	1.109	12.25
4266.081	0.181	1.934	2.074	14.76	0.093	1.000	1.099	12.14	0.093	1.000	1.099	12.14
4268.915	0.179	1.911	2.051	14.60	0.094	1.009	1.108	12.24	0.094	1.010	1.109	12.25
4276.836	0.180	1.919	2.059	14.65	0.093	0.998	1.097	12.12	0.094	1.008	1.107	12.23
4283.169	0.180	1.914	2.054	14.62	0.094	1.006	1.105	12.21	0.094	1.006	1.105	12.21
4284.838	0.180	1.914	2.054	14.62	0.093	0.996	1.095	12.10	0.094	1.006	1.105	12.21
4287.566	0.180	1.913	2.053	14.61	0.094	1.005	1.104	12.19	0.093	0.995	1.094	12.08
4288.310	0.181	1.923	2.063	14.68	0.095	1.015	1.114	12.30	0.093	0.995	1.094	12.08
4289.525	0.180	1.912	2.052	14.60	0.093	0.995	1.094	12.08	0.095	1.015	1.114	12.30
4290.377	0.179	1.902	2.042	14.53	0.094	1.005	1.104	12.19	0.094	1.005	1.104	12.19
4290.542	0.180	1.912	2.052	14.60	0.094	1.004	1.103	12.18	0.094	1.005	1.104	12.19
4291.630	0.181	1.922	2.062	14.67	0.094	1.004	1.103	12.18	0.096	1.025	1.124	12.41
	$\phi = 65.5°$				$\phi = 65.5°$							
4196.699	0.051	0.567	0.635	10.87	0.050	0.559	0.627	10.73				
4197.257	0.051	0.567	0.635	10.87	0.051	0.570	0.638	10.92				
4203.730	0.052	0.577	0.645	11.04	0.052	0.579	0.647	11.08				
4207.566	0.051	0.566	0.634	10.85	0.052	0.577	0.645	11.04				
4216.136	0.052	0.576	0.644	11.03	0.051	0.564	0.632	10.82				
4220.509	0.052	0.575	0.643	11.01	0.052	0.575	0.643	11.01				
4232.887	0.054	0.593	0.661	11.32	0.052	0.573	0.641	10.97				
4233.328	0.054	0.593	0.661	11.32	0.054	0.593	0.661	11.32				
4257.815	0.054	0.590	0.658	11.26	0.053	0.580	0.648	11.09				
4258.477	0.054	0.590	0.658	11.26	0.052	0.569	0.637	10.90				
4265.418	0.053	0.579	0.647	11.08	0.054	0.589	0.657	11.25				
4266.081	0.055	0.600	0.668	11.44	0.055	0.600	0.668	11.44				
4268.915	0.055	0.599	0.667	11.42	0.055	0.599	0.667	11.42				
4276.836	0.054	0.588	0.656	11.23	0.054	0.587	0.655	11.21				
4283.169	0.054	0.587	0.655	11.21	0.054	0.586	0.654	11.20				
4284.838	0.054	0.587	0.655	11.21	0.053	0.576	0.644	11.02				
4287.566	0.054	0.586	0.654	11.20	0.053	0.575	0.643	11.01				
4288.310	0.055	0.596	0.664	11.47	0.053	0.575	0.643	11.01				
4289.525	0.054	0.586	0.654	11.20	0.053	0.575	0.643	11.01				
4290.377	0.053	0.576	0.644	11.02	0.053	0.575	0.643	11.01				
4290.542	0.054	0.586	0.654	11.20	0.053	0.575	0.643	11.01				
4291.630	0.054	0.586	0.654	11.20	0.054	0.585	0.653	11.18				

TABLE 11. — RESULTS FOR INDIVIDUAL PLATES. OBSERVATIONS OF 1908 — Continued.

Plate ω 186. 1908, Oct. 22, $7^h\ 45^m$ G. M. T. Measured by L. on T. Distance from Limb 1.0 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
		0.0				
☾	209.0	24.0	24.5	65.5	12.5	1.024
☉−☊	134.5	39.7	40.0	50.0	8.1	1.010
P	−25.9	86.0	86.0	4.0	5.2	1.004
D	5.1					
Diameter	171.2 mm					
Factor	1.012					

λ	$\phi = 4^\circ.0$				$\phi = 4^\circ.0$				$\phi = 50^\circ.0$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4196.699	0.176	1.920	2.060	14.66	0.176	1.920	2.060	14.66	0.091	1.000	1.099	12.14
4197.257	0.176	1.920	2.060	14.66	0.176	1.920	2.060	14.66	0.092	1.010	1.109	12.25
4203.730	0.177	1.926	2.066	14.70	0.176	1.915	2.055	14.62	0.092	1.010	1.109	12.25
4207.566	0.177	1.924	2.064	14.69	0.177	1.921	2.061	14.67	0.091	0.997	1.096	12.10
4216.136	0.177	1.921	2.061	14.67	0.176	1.909	2.049	14.58	0.093	1.015	1.114	12.30
4220.509	0.178	1.928	2.068	14.72	0.177	1.917	2.057	14.64	0.094	1.021	1.120	12.37
4232.887	0.178	1.919	2.059	14.65	0.178	1.920	2.060	14.66	0.093	1.009	1.108	12.24
4233.328	0.177	1.909	2.049	14.58	0.178	1.920	2.060	14.66	0.093	1.009	1.108	12.24
4257.815	0.179	1.918	2.058	14.65	0.181	1.938	2.078	14.79	0.093	1.002	1.101	12.16
4258.477	0.179	1.918	2.058	14.65	0.180	1.928	2.068	14.72	0.093	1.002	1.101	12.16
4265.418	0.178	1.901	2.041	14.52	0.181	1.922	2.062	14.67	0.093	1.000	1.099	12.14
4266.081	0.180	1.921	2.061	14.67	0.182	1.942	2.082	14.82	0.094	1.010	1.109	12.25
4268.915	0.180	1.920	2.060	14.66	0.180	1.921	2.061	14.67	0.094	1.009	1.108	12.24
4276.836	0.178	1.898	2.038	14.51	0.179	1.909	2.049	14.58	0.093	0.998	1.097	12.12
4283.169	0.180	1.916	2.056	14.63	0.182	1.936	2.076	14.77	0.094	1.005	1.104	12.19
4284.838	0.180	1.916	2.056	14.63	0.180	1.915	2.055	14.62	0.093	0.995	1.094	12.08
4287.566	0.179	1.906	2.046	14.56	0.180	1.914	2.054	14.62	0.094	1.005	1.104	12.19
4288.310	0.181	1.925	2.065	14.69	0.180	1.913	2.053	14.61	0.092	0.984	1.083	11.96
4289.525	0.179	1.904	2.044	14.55	0.182	1.933	2.073	14.75	0.093	0.994	1.093	12.07
4290.377	0.180	1.913	2.053	14.61	0.181	1.922	2.062	14.67	0.093	0.994	1.093	12.07
4290.542	0.180	1.912	2.052	14.60	0.182	1.932	2.072	14.74	0.094	1.004	1.103	12.18
4291.630	0.182	1.932	2.072	14.74	0.182	1.932	2.072	14.74	0.093	0.994	1.093	12.07
	$\phi = 65^\circ.5$				$\phi = 65^\circ.5$							
4196.699	0.052	0.580	0.648	11.09	0.050	0.556	0.624	10.68				
4197.257	0.053	0.590	0.658	11.26	0.050	0.556	0.624	10.68				
4203.730	0.052	0.580	0.648	11.09	0.052	0.577	0.645	11.04				
4207.566	0.052	0.577	0.645	11.04	0.050	0.553	0.621	10.63				
4216.136	0.052	0.575	0.643	11.01	0.049	0.540	0.608	10.41				
4220.509	0.053	0.585	0.653	11.18	0.052	0.574	0.642	10.99				
4232.887	0.052	0.573	0.641	10.97	0.052	0.572	0.640	10.96				
4233.328	0.053	0.583	0.651	11.14	0.052	0.572	0.640	10.96				
4257.815	0.054	0.590	0.658	11.26	0.052	0.566	0.634	10.85				
4258.477	0.053	0.580	0.648	11.09	0.051	0.555	0.623	10.66				
4265.418	0.054	0.589	0.657	11.25	0.051	0.554	0.622	10.65				
4266.081	0.054	0.589	0.657	11.25	0.052	0.565	0.633	10.84				
4268.915	0.054	0.588	0.656	11.23	0.052	0.565	0.633	10.84				
4276.836	0.054	0.587	0.655	11.21	0.052	0.564	0.632	10.82				
4283.169	0.052	0.566	0.634	10.85	0.052	0.562	0.630	10.78				
4284.838	0.054	0.586	0.654	11.20	0.052	0.562	0.630	10.78				
4287.566	0.054	0.585	0.653	11.18	0.050	0.544	0.612	10.48				
4288.310	0.055	0.596	0.664	11.37	0.052	0.562	0.630	10.78				
4289.525	0.053	0.575	0.643	11.01	0.052	0.561	0.629	10.77				
4290.377	0.054	0.585	0.653	11.18	0.051	0.550	0.618	10.58				
4290.542	0.052	0.565	0.633	10.84	0.052	0.561	0.629	10.77				
4291.630	0.053	0.575	0.643	11.01	0.051	0.550	0.618	10.58				

The results for the individual plates are summarized in Tables 12, 13, and 14, which are identical in form with Tables 5, 6, and 7 for the 1906–1907 observations.

TABLE 12.—MEAN RESULTS FOR EACH PLATE FROM ALL LINES. OBSERVATIONS OF 1908.

Plate No.	Date.	No. of Lines.	ϕ	$v+v_1$	ξ	Plate No.	Date.	No. of Lines.	ϕ	$v+v_1$	ξ
	1908		°	km	°		1908		°	km	°
ω 103	Feb. 16	22	−0.2	2.071	14.71	$\omega\ 117_1$	May 26	22	−0.6	2.056	14.60
			14.1	1.948	14.26				14.4	1.895	13.89
			29.9	1.635	13.39				29.4	1.664	13.56
			44.8	1.289	12.89				44.6	1.301	12.98
			59.5	0.774	10.83				60.4	0.837	12.03
			73.7	0.439	11.11				75.9	0.372	10.84
$\omega\ 105_1$	Mar. 10	22	−0.3	2.057	14.60	$\omega\ 117_2$	May 26	22	−0.6	2.058	14.61
			14.6	1.989	14.59				14.4	1.898	13.91
			29.4	1.634	13.31				29.4	1.664	13.57
			44.2	1.346	13.33				44.6	1.298	12.95
			59.3	0.847	11.77				60.4	0.845	12.15
			74.3	0.419	11.00				75.9	0.385	11.22
$\omega\ 105_1$	Mar. 10	22	−0.3	2.081	14.77	$\omega\ 120_1$	June 2	22	2.3	2.053	14.58
			14.6	1.971	14.47				12.7	1.959	14.25
			29.4	1.662	13.54				17.3	1.862	13.86
			44.2	1.342	13.29				32.8	1.645	13.89
			59.3	0.840	11.68				48.3	1.175	12.54
			74.3	0.401	10.51				63.8	0.640	10.29
									77.3	0.335	10.82
$\omega\ 105_2$	Mar. 10	22	−0.4	2.072	14.72	$\omega\ 120_2$	June 2	22	4.3	2.042	14.54
			−0.4	2.070	14.71				10.7	2.009	14.51
			15.2	1.956	14.39				19.3	1.840	13.86
			30.1	1.675	13.75				34.8	1.610	13.92
									50.3	1.159	13.88
									65.3	0.693	12.04
									79.3	0.259	9.91
$\omega\ 105_2$	Mar. 10	22	−0.4	2.080	14.77	ω 128	June 9	22	−0.5	2.057	14.61
			−0.4	2.073	14.72				14.5	1.917	14.06
			15.2	1.966	14.45				29.5	1.687	13.76
			30.1	1.669	13.71				44.5	1.260	12.54
									59.5	0.832	11.64
									74.5	0.380	10.12
ω 106	Mar. 10	22	45.1	1.312	13.20	ω 132	June 10	22	4.4	2.032	14.47
			60.4	0.792	11.38				19.4	1.897	14.28
			75.1	0.416	11.49				34.4	1.593	13.73
									49.4	1.169	12.75
									64.4	0.715	11.75
									79.4	0.262	10.12
ω 106	Mar. 10	22	45.1	1.293	13.01	ω 134	June 11	22	−0.5	2.043	14.51
			60.4	0.747	10.80				4.5	2.013	14.54
			75.1	0.407	11.24				19.5	1.859	14.00
			75.1	0.407	11.24				34.5	1.557	13.42
			60.4	0.797	11.44				49.5	1.165	12.74
			45.1	1.302	13.10				64.5	0.707	11.66
			30.1	1.658	13.61				79.5	0.262	10.22
			15.2	1.971	14.51						
ω 113	Apr. 8	22	0.0	2.100	14.92	$\omega\ 135_1$	June 11	22	−0.5	2.064	14.66
			14.9	1.969	14.46				14.5	1.940	14.22
			29.8	1.679	13.75				29.5	1.676	13.67
			44.8	1.298	12.98				44.5	1.245	12.39
			60.7	0.801	11.62				59.5	0.772	10.80
			75.7	0.360	10.36				74.5	0.381	10.12
									79.5	0.262	10.22
ω 113	Apr. 8	22	0.0	2.081	14.77	$\omega\ 135_2$	June 11	22	−0.5	2.038	14.46
			14.9	1.961	14.41				14.5	1.938	14.21
			29.8	1.682	13.76				29.5	1.681	13.72
			44.8	1.294	12.94				44.5	1.237	12.31
			60.7	0.793	11.52				59.5	0.772	10.79
			75.7	0.363	10.45				74.5	0.384	10.21
									79.5	0.260	10.12

TABLE 12.—MEAN RESULTS FOR EACH PLATE FROM ALL LINES. OBSERVATIONS OF 1908—Continued.

Plate No.	Date.	No. of Lines.	ϕ	$v+v_1$	ξ
	1908		°	km	°
ω 136	June 11	22	−0.5	2.047	14.53
			4.5	1.981	14.11
			19.5	1.847	13.91
			34.5	1.551	13.36
			49.5	1.158	12.66
			64.5	0.656	10.81
			79.5	0.266	10.36
ω 146	Aug. 5	22	0.3	2.028	14.40
			15.2	1.934	14.23
			30.1	1.658	13.60
			45.5	1.265	12.81
			60.7	0.682	10.97
			75.4	0.405	11.35
ω 147	Aug. 5	22	0.3	2.052	14.57
			15.2	1.959	14.42
			30.1	1.686	13.85
			45.5	1.269	12.86
			60.7	0.781	11.34
			75.4	0.401	11.30
ω 148	Aug. 5	22	0.3	2.056	14.60
			15.2	1.959	14.41
			30.1	1.688	13.85
			35.5	1.265	12.81
			60.7	0.798	11.59
			75.4	0.403	11.36
ω 151	Aug. 6	22	−0.3	2.062	14.64
			−0.3	2.060	14.63
			14.6	1.952	14.32
			44.6	1.270	12.66
			59.8	0.809	11.42
			74.9	0.415	11.31
ω 161	Aug. 26	22	4.2	2.044	14.55
			10.9	1.989	14.38
			19.1	1.886	14.18
			34.2	1.547	13.27
			49.4	1.080	11.78
			65.0	0.631	10.60
ω 162	Aug. 26	22	4.2	2.048	14.57
			10.9	1.986	14.36
			19.1	1.878	14.11
			34.2	1.505	12.91
			49.4	1.144	12.48
			65.0	0.693	11.67
ω 163	Aug. 26	22	4.2	2.040	14.52
			10.9	2.002	14.46
			19.1	1.886	14.18
			34.2	1.548	13.29
			49.4	1.149	12.54
			65.0	0.688	11.55
ω 164	Aug. 26	22	4.2	2.029	14.44
			10.9	1.995	14.42
			19.1	1.870	14.06
			34.2	1.556	13.36
		20	49.4	1.152	12.56
		20	65.0	0.700	11.76

Plate No.	Date.	No. of Lines.	ϕ	$v+v_1$	ξ
	1908		°	km	°
ω 165	Aug. 27	22	4.2	2.032	14.47
			11.6	1.992	14.43
			19.1	1.880	14.12
			34.1	1.557	13.35
			49.4	1.142	12.46
			64.8	0.688	11.48
ω 166	Aug. 27	22	4.2	2.049	14.58
			11.6	1.984	14.38
			19.1	1.874	14.07
			34.1	1.561	13.38
			49.4	1.150	12.55
			64.8	0.691	11.52
ω 179	Sept. 30	22	60.1	0.865	12.32
			60.1	0.867	12.35
ω 180	Sept. 30	22	60.1	0.808	11.51
			60.1	0.810	11.53
ω 182	Oct. 9	22	11.0	1.990	14.39
			11.0	1.992	14.40
			19.0	1.843	13.84
			33.9	1.483	12.69
ω 183	Oct. 9	22	11.0	1.991	14.40
			11.0	1.997	14.44
			19.0	1.864	14.00
			19.0	1.858	13.95
			19.0	1.859	13.96
			33.9	1.549	13.25
			33.9	1.550	13.26
			33.9	1.546	13.22
ω 184	Oct. 22	22	4.0	2.059	14.65
			50.0	1.115	12.31
			50.0	1.128	12.46
			60.3	0.823	11.79
			60.3	0.827	11.85
			65.5	0.668	11.46
			65.5	0.663	11.37
ω 185	Oct. 22	22	4.0	2.060	14.66
			50.0	1.103	12.18
			50.0	1.105	12.21
			65.5	0.652	11.17
			65.5	0.647	11.08
ω 186	Oct. 22	22	4.0	2.057	14.64
			4.0	2.063	14.68
			50.0	1.101	12.17
			65.5	0.650	11.14
			65.5	0.628	10.75

TABLE 13.—MEAN RESULTS FOR EACH LATITUDE FROM ALL LINES. OBSERVATIONS OF 1908.

PLATE No.	ϕ	$v + v_1$	ξ
	°	km	°
ω 103	0.2	2.071	14.71
105$_1$	0.3	2.057	14.60
105$_1$	0.3	2.081	14.77
105$_2$	0.4	2.072	14.72
105$_2$	0.4	2.070	14.71
105$_2$	0.4	2.080	14.77
105$_2$	0.4	2.073	14.72
113	0.0	2.100	14.92
113$_1$	0.0	2.081	14.77
117$_1$	0.6	2.056	14.60
117$_2$	0.6	2.058	14.61
128	0.5	2.057	14.61
134	0.5	2.043	14.51
135$_1$	0.5	2.064	14.66
135$_2$	0.5	2.038	14.46
136	0.5	2.047	14.53
146	0.3	2.028	14.40
147	0.3	2.052	14.57
148	0.3	2.056	14.60
151	0.3	2.062	14.64
151	0.3	2.060	14.63
Means,	0.4	2.062	14.64

PLATE No.	ϕ	$v + v_1$	ξ
ω 120$_1$	2.3	2.053	14.58
120$_2$	4.3	2.042	14.54
132	4.4	2.032	14.47
134	4.5	2.013	14.54
136	4.5	1.981	14.11
161	4.2	2.044	14.55
162	4.2	2.048	14.57
163	4.2	2.040	14.52
164	4.2	2.029	14.44
165	4.2	2.032	14.47
166	4.2	2.049	14.58
184	4.0	2.059	14.65
185	4.0	2.060	14.66
186	4.0	2.057	14.64
186	4.0	2.063	14.68
Means,	4.1	2.040	14.53

PLATE No.	ϕ	$v + v_1$	ξ
ω 120$_1$	12.7	1.959	14.25
120$_2$	10.7	2.009	14.51
161	10.9	1.989	14.38
162	10.9	1.986	14.36
163	10.9	2.002	14.46
164	10.9	1.995	14.42
165	11.6	1.992	14.43
166	11.6	1.984	14.38
182	11.0	1.990	14.39
182	11.0	1.992	14.40
183	11.0	1.991	14.40
183	11.0	1.997	14.44
Means,	11.2	1.990	14.40

PLATE No.	ϕ	$v + v_1$	ξ
	°	km	°
ω 103	14.1	1.948	14.26
105$_1$	14.6	1.989	14.59
105$_1$	14.6	1.971	14.47
105$_2$	15.2	1.956	14.39
105$_2$	15.2	1.966	14.45
106	15.2	1.971	14.51
113	14.9	1.969	14.46
113	14.9	1.961	14.41
117$_1$	14.4	1.895	13.89
117$_2$	14.4	1.898	13.91
120$_1$	17.3	1.862	13.86
128	14.5	1.917	14.06
135$_1$	14.5	1.940	14.22
135$_2$	14.5	1.938	14.21
146	15.2	1.934	14.23
147	15.2	1.959	14.42
148	15.2	1.959	14.42
151	14.6	1.952	14.32
Means,	14.9	1.944	14.28

PLATE No.	ϕ	$v + v_1$	ξ
ω 120$_2$	19.3	1.840	13.86
132	19.4	1.897	14.28
134	19.5	1.859	14.00
136	19.5	1.847	13.91
161	19.1	1.866	14.18
162	19.1	1.878	14.11
163	19.1	1.886	14.18
164	19.1	1.870	14.06
165	19.1	1.880	14.12
166	19.1	1.874	14.07
182	19.0	1.843	13.84
183	19.0	1.864	14.00
183	19.0	1.858	13.95
183	19.0	1.859	13.96
Means,	19.2	1.867	14.04

PLATE No.	ϕ	$v + v_1$	ξ
ω 103	29.9	1.635	13.39
105$_1$	29.4	1.634	13.31
105$_1$	29.4	1.662	13.54
105$_2$	30.1	1.675	13.75
105$_2$	30.1	1.669	13.71
106	30.1	1.658	13.61
113	29.8	1.679	13.75
113	29.8	1.682	13.76
117$_1$	29.4	1.664	13.56
117$_2$	29.4	1.664	13.57
128	29.5	1.687	13.76
135$_1$	29.5	1.676	13.67
135$_2$	29.5	1.681	13.72
146	30.1	1.658	13.60
147	30.1	1.686	13.85
148	30.1	1.688	13.85
Means,	29.8	1.669	13.65

PLATE No.	ϕ	$v + v_1$	ξ
	°	km	°
ω 120$_1$	32.8	1.645	13.89
120$_2$	34.8	1.610	13.92
132	34.4	1.593	13.73
134	34.5	1.557	13.42
136	34.5	1.551	12.36
161	34.2	1.547	13.27
162	34.2	1.505	12.91
163	34.2	1.548	13.29
164	34.2	1.556	13.36
165	34.1	1.557	13.37
166	34.1	1.561	13.38
182	33.9	1.483	12.69
183	33.9	1.549	13.25
183	33.9	1.550	13.26
183	33.9	1.546	13.22
Means,	34.1	1.557	13.35

PLATE No.	ϕ	$v + v_1$	ξ
ω 103	44.8	1.289	12.89
105$_1$	44.2	1.346	13.33
105$_1$	44.2	1.342	13.29
106	45.1	1.312	13.20
106	45.1	1.293	13.01
106	45.1	1.302	13.10
113	44.8	1.298	12.98
113	44.8	1.294	12.94
117$_1$	44.6	1.301	12.98
117$_2$	44.6	1.298	12.95
128	44.5	1.260	12.54
135$_1$	44.5	1.245	12.39
135$_2$	44.5	1.237	12.31
146	45.5	1.265	12.81
147	45.5	1.269	12.86
148	45.5	1.265	12.81
151	45.6	1.270	12.66
Means,	44.8	1.289	12.88

PLATE No.	ϕ	$v + v_1$	ξ
ω 120$_1$	48.3	1.175	12.54
120$_2$	50.3	1.159	12.88
132	49.4	1.169	12.75
134	49.5	1.165	12.74
136	49.5	1.158	12.66
161	49.4	1.080	11.78
162	49.4	1.144	12.48
163	49.4	1.149	12.54
164	49.4	1.152	12.56
165	49.4	1.142	12.46
166	49.4	1.150	12.55
184	50.0	1.115	12.31
184	50.0	1.128	12.46
185	50.0	1.103	12.18
185	50.0	1.105	12.21
186	50.0	1.101	12.17
Means,	49.6	1.137	12.45

PLATE No.	ϕ	$v + v_1$	ξ
	°	km	°
ω 103	59.5	0.774	10.83
105$_1$	59.3	0.847	11.77
105$_1$	59.3	0.840	11.68
106	60.4	0.792	11.38
106	60.4	0.747	10.80
106	60.4	0.797	11.44
113	60.7	0.801	11.62
113	60.7	0.793	11.52
117$_1$	60.4	0.837	12.03
117$_2$	60.4	0.845	12.15
128	59.5	0.832	11.64
135$_1$	59.5	0.772	10.80
135$_2$	59.5	0.772	10.79
146	60.7	0.755	10.97
147	60.7	0.781	11.34
148	60.7	0.798	11.59
151	59.8	0.809	11.42
179	60.1	0.866	12.34
180	60.1	0.808	11.51
180	60.1	0.810	11.53
184	60.3	0.823	11.79
184	60.3	0.827	11.85
Means,	60.1	0.801	11.49

PLATE No.	ϕ	$v + v_1$	ξ
ω 120$_1$	63.8	0.640	10.29
120$_2$	65.3	0.693	12.04
132	64.4	0.715	11.75
134	64.5	0.707	11.66
136	64.5	0.656	10.81
161	65.0	0.631	10.60
162	65.0	0.693	11.67
163	65.0	0.688	11.55
164	65.0	0.700	11.76
165	64.8	0.688	11.48
166	64.8	0.691	11.52
184	65.5	0.668	11.46
184	65.5	0.663	11.37
185	65.5	0.652	11.17
185	65.5	0.647	11.08
186	65.5	0.650	11.14
186	65.5	0.628	10.75
Means,	65.0	0.671	11.30

PLATE No.	ϕ	$v + v_1$	ξ
ω 103	73.7	0.439	11.11
105$_1$	74.3	0.419	11.00
105$_1$	74.3	0.401	10.51
106	75.1	0.416	11.49
106	75.1	0.407	11.24
106	75.1	0.407	11.24
113	75.7	0.360	10.36
113	75.7	0.363	10.45
117$_1$	75.9	0.372	10.84
117$_2$	75.9	0.385	11.22
128	74.5	0.380	10.12
135$_1$	74.5	0.381	10.12
135$_2$	74.5	0.384	10.21
146	75.4	0.405	11.35
147	75.4	0.401	11.30
148	75.4	0.403	11.36
151	74.9	0.415	11.31
Means,	75.0	0.396	10.86

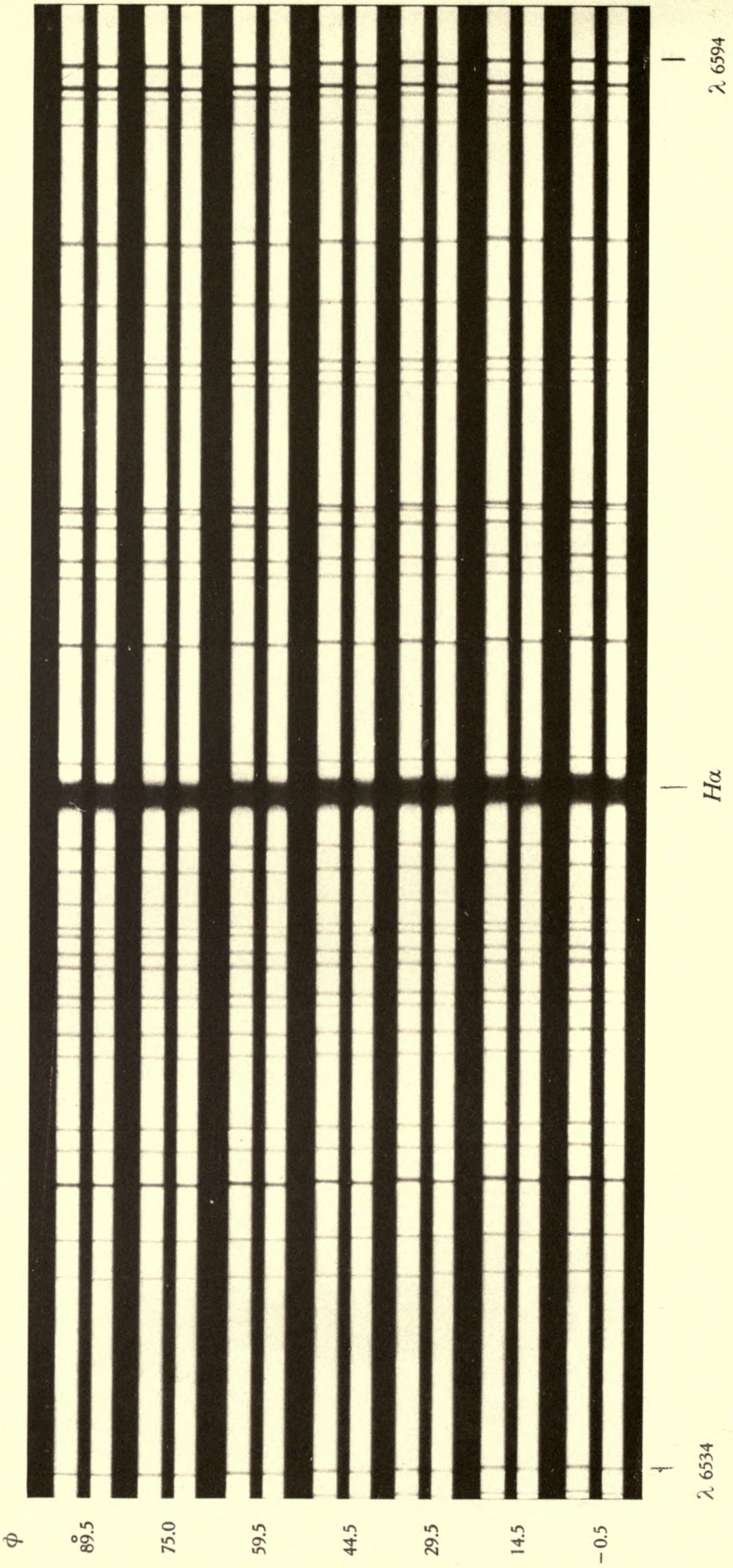
PLATE No.	ϕ	$v + v_1$	ξ
ω 120$_1$	77.3	0.335	10.82
120$_2$	79.3	0.259	9.91
132	79.4	0.262	10.12
134	79.5	0.262	10.22
135$_1$	79.5	0.262	10.22
135$_2$	79.5	0.260	10.12
136	79.5	0.266	10.36
Means,	79.1	0.272	10.25

TABLE 14.—MEAN RESULTS FOR EACH LINE FROM ALL PLATES. OBSERVATIONS OF 1908.

λ	ELEMENT.	$\phi = 0^\circ.4$			$\phi = 4^\circ.1$			$\phi = 11^\circ.2$			$\phi = 14^\circ.9$		
		NO. OF PLATES.	$v + v_1$	ξ	NO. OF PLATES.	$v + v_1$	ξ	NO. OF PLATES.	$v + v_1$	ξ	NO. OF PLATES.	$v + v_1$	ξ
			km	°		km	°		km	°		km	°
4196.699	*La*	21	2.034	14.44	15	2.023	14.40	12	1.979	14.31	18	1.925	14.14
4197.257	*CN*	21	2.047	14.53	15	2.028	14.43	12	1.978	14.31	18	1.927	14.16
4203.730	*Cr*	21	2.061	14.63	15	2.034	14.48	12	1.992	14.42	18	1.944	14.28
4207.566	*CN*	21	2.054	14.58	15	2.038	14.50	12	1.989	14.39	18	1.937	14.23
4216.136	*CN*	21	2.042	14.49	15	2.031	14.46	12	1.983	14.34	18	1.930	14.18
4220.509	*Fe*	21	2.059	14.62	15	2.052	14.61	12	1.998	14.45	18	1.945	14.29
4232.887	*Fe*	21	2.066	14.67	15	2.048	14.58	12	1.992	14.41	18	1.948	14.31
4233.328	*Mn*	21	2.055	14.59	15	2.052	14.61	12	1.995	14.43	18	1.945	14.29
4257.815	*Mn*	21	2.077	14.75	15	2.049	14.58	12	1.998	14.45	18	1.953	14.34
4258.477	*Fe*	21	2.068	14.68	15	2.046	14.56	12	1.998	14.45	18	1.952	14.34
4265.418	*Fe*	21	2.060	14.62	15	2.042	14.53	12	1.993	14.41	18	1.946	14.30
4266.081	*Mn*	21	2.073	14.72	15	2.051	14.60	12	1.997	14.44	18	1.946	14.30
4268.915	*Fe*	21	2.073	14.72	15	2.045	14.56	12	1.994	14.42	18	1.949	14.32
4276.836	*–Zr*	21	2.067	14.68	15	2.037	14.50	12	1.986	14.36	18	1.948	14.31
4283.169	*Ca*	21	2.066	14.67	15	2.039	14.51	12	1.991	14.40	18	1.948	14.31
4284.838	*Ni*	21	2.069	14.69	15	2.040	14.52	12	1.988	14.38	18	1.936	14.22
4287.566	*Ti*	21	2.066	14.67	15	2.036	14.49	12	1.988	14.38	18	1.944	14.28
4288.310	*Ti, Fe*	21	2.064	14.65	15	2.036	14.49	12	1.990	14.39	18	1.949	14.32
4289.525	*Ca*	21	2.069	14.69	15	2.040	14.52	12	1.992	14.41	18	1.950	14.33
4290.377	*Ti*	21	2.059	14.62	15	2.034	14.48	12	1.986	14.36	18	1.938	14.24
4290.542	*Fe*	21	2.068	14.68	15	2.040	14.52	12	1.994	14.42	18	1.953	14.35
4291.630	*Fe*	21	2.071	14.70	15	2.041	14.53	12	1.992	14.41	18	1.947	14.30

λ	ELEMENT.	$\phi = 19^\circ.2$			$\phi = 29^\circ.8$			$\phi = 34^\circ.1$			$\phi = 44^\circ.8$		
4196.699	*La*	14	1.859	13.98	16	1.652	13.52	15	1.546	13.26	17	1.275	12.75
4197.257	*CN*	14	1.859	13.98	16	1.655	13.54	15	1.544	13.24	17	1.280	12.80
4203.730	*Cr*	14	1.871	14.06	16	1.671	13.67	15	1.561	13.38	17	1.288	12.88
4207.566	*CN*	14	1.875	14.10	16	1.667	13.64	15	1.560	13.37	17	1.283	12.83
4216.136	*CN*	14	1.862	14.00	16	1.647	13.47	15	1.548	13.27	17	1.272	12.72
4220.509	*Fe*	14	1.874	14.09	16	1.671	13.67	15	1.561	13.38	17	1.288	12.88
4232.887	*Fe*	14	1.875	14.10	16	1.669	13.65	15	1.559	13.37	17	1.282	12.82
4233.328	*Mn*	14	1.878	14.12	16	1.662	13.60	15	1.561	13.38	17	1.287	12.87
4257.815	*Mn*	14	1.876	14.10	16	1.676	13.71	15	1.567	13.43	17	1.300	13.00
4258.477	*Fe*	14	1.871	14.06	16	1.677	13.72	15	1.560	13.37	17	1.294	12.94
4265.418	*Fe*	14	1.861	13.99	16	1.666	13.63	15	1.555	13.33	17	1.284	12.84
4266.081	*Mn*	14	1.873	14.08	16	1.672	13.68	15	1.561	13.38	17	1.297	12.97
4268.915	*Fe*	14	1.869	14.05	16	1.673	13.69	15	1.559	13.37	17	1.292	12.92
4276.836	*–Zr*	14	1.864	14.02	16	1.673	13.69	15	1.554	13.32	17	1.284	12.84
4283.169	*Ca*	14	1.866	14.03	16	1.672	13.68	15	1.553	13.32	17	1.287	12.87
4284.838	*Ni*	14	1.860	13.98	16	1.657	13.56	15	1.557	13.31	17	1.282	12.82
4287.566	*Ti*	14	1.862	14.00	16	1.671	13.67	15	1.554	13.32	17	1.292	12.92
4288.310	*Ti, Fe*	14	1.865	14.02	16	1.675	13.70	15	1.560	13.37	17	1.291	12.91
4289.525	*Ca*	14	1.861	13.99	16	1.676	13.71	15	1.558	13.36	17	1.297	12.97
4290.377	*Ti*	14	1.858	13.97	16	1.666	13.63	15	1.557	13.36	17	1.278	12.78
4290.542	*Fe*	14	1.869	14.05	16	1.683	13.77	15	1.565	13.42	17	1.294	12.94
4291.630	*Fe*	14	1.871	14.06	16	1.680	13.74	15	1.562	13.39	17	1.294	12.94

λ	ELEMENT.	$\phi = 49^\circ.6$			$\phi = 60^\circ.1$			$\phi = 65^\circ.0$			$\phi = 75^\circ.0$			$\phi = 79^\circ.1$		
		NO. OF PLATES.	$v + v_1$	ξ	NO. OF PLATES.	$v + v_1$	ξ	NO. OF PLATES.	$v + v_1$	ξ	NO. OF PLATES.	$v + v_1$	ξ	NO. OF PLATES.	$v + v_1$	ξ
			km	°		km	°		km	°		km	°		km	°
4196.699	*La*	16	1.125	12.32	22	0.791	11.26	17	0.658	11.05	17	0.380	10.42	7	0.267	10.02
4197.257	*CN*	16	1.125	12.32	22	0.791	11.26	17	0.663	11.14	17	0.385	10.56	7	0.269	10.10
4203.730	*Cr*	16	1.138	12.46	22	0.805	11.46	17	0.670	11.26	17	0.392	10.75	7	0.269	10.10
4207.566	*CN*	16	1.138	12.46	22	0.804	11.45	17	0.666	11.19	17	0.388	10.65	7	0.270	10.14
4216.136	*CN*	16	1.130	12.38	22	0.796	11.34	17	0.659	11.07	17	0.386	10.59	7	0.261	9.80
4220.509	*Fe*	16	1.144	12.53	22	0.805	11.46	17	0.671	11.27	17	0.400	10.97	7	0.267	10.02
4232.887	*Fe*	16	1.138	12.46	22	0.801	11.41	17	0.671	11.27	17	0.397	10.89	7	0.266	9.99
4233.328	*Mn*	16	1.139	12.48	22	0.805	11.46	17	0.671	11.27	17	0.386	10.59	7	0.269	10.10
4257.815	*Mn*	15	1.142	12.51	22	0.816	11.62	16	0.675	11.34	17	0.406	11.14	7	0.281	10.55
4258.477	*Fe*	15	1.138	12.46	22	0.807	11.49	16	0.672	11.29	17	0.399	10.94	7	0.267	10.02
4265.418	*Fe*	16	1.134	12.42	22	0.807	11.49	17	0.672	11.29	17	0.397	10.89	7	0.277	10.40
4266.081	*Mn*	16	1.141	12.50	22	0.805	11.46	17	0.676	11.36	17	0.402	11.03	7	0.282	10.59
4268.915	*Fe*	16	1.139	12.48	22	0.811	11.55	17	0.482	11.46	17	0.404	11.08	7	0.277	10.40
4276.836	*–Zr*	16	1.136	12.44	22	0.812	11.56	17	0.674	11.32	17	0.402	11.03	7	0.276	10.36
4283.169	*Ca*	16	1.139	12.48	22	0.811	11.55	17	0.672	11.29	17	0.398	10.91	7	0.274	10.29
4284.838	*Ni*	16	1.137	12.45	22	0.807	11.49	17	0.673	11.31	17	0.406	11.14	7	0.270	10.14
4287.566	*Ti*	16	1.134	12.42	22	0.810	11.54	17	0.670	11.26	17	0.400	10.97	7	0.274	10.29
4288.310	*Ti, Fe*	16	1.140	12.49	22	0.810	11.54	17	0.674	11.32	17	0.399	10.94	7	0.281	10.55
4289.525	*Ca*	16	1.144	12.53	22	0.808	11.51	17	0.679	11.41	17	0.399	10.94	7	0.279	10.47
4290.377	*Ti*	16	1.132	12.40	22	0.800	11.39	17	0.669	11.24	17	0.392	10.75	7	0.270	10.14
4290.542	*Fe*	16	1.141	12.50	22	0.812	11.56	17	0.677	11.37	17	0.402	11.03	7	0.270	10.14
4291.630	*Fe*	16	1.144	12.53	22	0.813	11.58	17	0.676	11.36	17	0.400	10.97	7	0.278	10.44



Spectra used in the Study of the *Hα* Line. Enlargement about 3.3 times.

9. Special Observations on the *a* Line of Hydrogen.

As will be seen when we reach the discussion of the results for the individual lines of the reversing layer on page 109 of this investigation, the observations of 1906–1907 and of 1908 agree in indicating that different lines give different velocities of rotation. Since this result clearly is connected with the level at which the lines originate in the sun's atmosphere, an investigation of the lines of the elements which show great differences of level becomes of much interest. The two elements which appear to rise to the greatest height above the solar photosphere, as indicated by observations of the chromospheric spectrum, are calcium and hydrogen. Unfortunately, accurate measures of the H and K lines of calcium at the sun's limb are very difficult, on account of the great variation in their width and appearance and the presence of bright reversals. Exclusive of these lines, the blue line of calcium at λ 4227, which represents a considerably lower level than H and K, remains. Among the hydrogen lines, $H\delta$ and $H\beta$ are practically ruled out on account of the presence of foreign lines, and $H\gamma$ is rendered unsymmetrical by the same cause. Accordingly, in the selection of lines for measurement only $H\alpha$ was left. The investigation of this line became of interest for several other reasons. Photographs of the spectra of the center and limb of the sun indicated that $H\alpha$ was greatly widened at the limb, while the other hydrogen lines, with the possible exception of $H\beta$, were either unchanged or slightly narrowed. The line also showed no such displacement toward the red at the sun's limb as was found for essentially all of the lines in the solar spectrum. Moreover, plates taken with the spectroheliograph with the *a* line showed structure differing in many respects from that obtained through the other hydrogen lines. All of these results are in harmony with the chromospheric observations in indicating a very high level for the hydrogen gas which produces $H\alpha$ in the sun's atmosphere.

The measurement of the center and limb plates soon showed that the $H\alpha$ line would give abnormally high rotational velocities, and the first photographs taken with the regular rotation apparatus confirmed this result. A few preliminary results of this investigation were published early in 1908 (15), but a much more extensive series of plates was obtained during the spring of that year. The use of fine-grained plates sensitized to the red by the use of Wallace's formula proved of the greatest value in the investigation, since the edges of the line are so hazy as to make the superior defining power of these plates, and their excellent contrast, of much assistance in the measurement. All of the results given were obtained from plates of this character.

It is of course hardly necessary to state that the degree of accuracy attained in the measurement of $H\alpha$ is of quite another order from that for the narrow lines of the reversing layer. The width of $H\alpha$ at the sun's limb is about 1.15 Ångströms, as against 0.15 Ångström for the lines employed in the reversing layer. Moreover, all of the plates used for measurement were taken in the spectrum of the second order, thus giving a linear scale only two-thirds that used for the reversing layer. It seems probable that the accidental errors of setting must be several times as great for $H\alpha$ as for the sharper and narrower lines.

I have already referred to the marked widening and change in appearance of $H\alpha$ at the sun's limb. The study of plates taken inside the limb soon showed that the greater part of this effect must take place within a comparatively narrow range, some 3 or 4 mm, on a solar radius of about 84 mm. This is what we should expect in case the change in the appearance of $H\alpha$ is due to the great increase in the length in path of the light at the sun's edge, since the length of this path decreases very rapidly with increasing distance inward from the limb. Accordingly, two series of observations have been made, the first as close to the limb as the slit could be set without danger from the introduction of chromospheric light, and the second at an average distance of about 3 mm inside the limb. The details of these observations and the summaries of the results are given in Tables 15–18. The tables are similar in arrangement to those containing the data for the reversing layer. A comparison with the values for the normal places derived from the two series of observations on the reversing layer is given in Table 35.

TABLE 15.—OBSERVATIONS ON THE α LINE OF HYDROGEN AT THE LIMB.

Plate No.	Gr. Mean Date.	ϕ	Δ	v	$v+v_1$	ξ
	1908 h m	°		km	km	°
ω 110	Mar. 24 6 20	0.2	0.188	1.98	2.12	15.0
		15.1	0.180	1.91	2.05	15.1
		29.9	0.154	1.63	1.75	14.3
		44.3	0.127	1.34	1.45	14.4
		60.4	0.083	0.89	0.96	13.8
		65.3	0.069	0.76	0.82	13.9
		75.2	0.042	0.50	0.54	15.0
ω 115	May 15 5 10	−0.4	0.192	2.01	2.15	15.3
		14.6	0.184	1.89	2.02	14.8
		29.6	0.153	1.59	1.71	14.0
		44.9	0.122	1.28	1.39	13.9
		60.5	0.082	0.86	0.94	13.6
		75.9	0.042	0.44	0.48	14.0
ω 118_1	June 1 10 30	−0.6	0.194	2.02	2.15	15.3
		14.4	0.184	1.92	2.05	15.0
		29.4	0.158	1.64	1.76	14.3
		44.9	0.135	1.41	1.51	15.1
		60.4	0.084	0.88	0.95	13.6
		75.9	0.042	0.45	0.49	14.3
ω 118_2	June 1 10 30	−0.6	0.196	2.04	2.17	15.4
		14.4	0.184	1.92	2.05	15.0
		29.4	0.155	1.61	1.73	14.1
		44.9	0.128	1.33	1.43	14.3
		60.4	0.086	0.89	0.96	13.8
		75.9	0.046	0.48	0.52	15.2
ω 122	June 9 2 45	−0.5	0.192	2.00	2.13	15.1
		14.5	0.178	1.86	1.99	14.6
		29.5	0.160	1.67	1.79	14.6
		44.5	0.120	1.24	1.35	13.4
		59.5	0.082	0.85	0.93	13.0
		75.0	0.042	0.44	0.49	13.4
ω 123	June 9 2 45	−0.5	0.196	2.03	2.16	15.3
		14.5	0.182	1.89	2.02	14.8
		29.5	0.159	1.65	1.77	14.4
		44.5	0.126	1.31	1.42	14.1
		59.5	0.084	0.88	0.96	13.4
		75.0	0.041	0.43	0.48	13.2
ω 124_1	June 9 2 45	−0.5	0.192	1.96	2.09	14.8
		14.5	0.185	1.90	2.03	14.9
		29.5	0.161	1.65	1.77	14.4
		44.5	0.126	1.29	1.31	13.0
		59.5	0.087	0.91	0.99	13.8
		75.0	0.046	0.47	0.52	14.3
ω 124_2	June 9 2 45	−0.5	0.196	2.01	2.14	15.2
		14.5	0.187	1.91	2.04	15.0
		29.5	0.160	1.65	1.77	14.4
		44.5	0.125	1.28	1.39	13.8
		59.5	0.086	0.89	0.97	13.6
		75.0	0.046	0.47	0.52	14.3
ω 125_1	June 9 7 10	−0.5	0.196	2.02	2.15	15.3
		14.5	0.184	1.90	2.03	14.9
		29.5	0.163	1.69	1.81	14.8
		44.5	0.126	1.30	1.41	14.0
		59.5	0.084	0.86	0.92	12.9
		75.0	0.044	0.45	0.50	13.7
ω 125_2	June 9 7 10	−0.5	0.194	2.01	2.14	15.2
		14.5	0.183	1.89	2.02	14.8
		29.5	0.162	1.67	1.79	14.6
		44.5	0.128	1.33	1.44	14.3
		59.5	0.084	0.87	0.96	13.4
		75.0	0.042	0.43	0.48	13.2
ω 126_1	June 9 10 15	−0.5	0.195	2.01	2.14	15.2
		14.5	0.184	1.90	2.03	14.9
		29.5	0.163	1.68	1.80	14.7
		44.5	0.126	1.30	1.41	14.0
		59.5	0.084	0.86	0.94	13.1
		75.0	0.044	0.45	0.50	13.7

Plate No.	Gr. Mean Date.	ϕ	Δ	v	$v+v_1$	ξ
	1908 h m	°		km	km	°
ω 126_2	June 9 10 15	−0.5	0.196	2.03	2.16	15.3
		14.5	0.182	1.88	2.01	14.7
		29.5	0.166	1.70	1.82	14.8
		44.5	0.128	1.32	1.43	14.2
		59.5	0.087	0.89	0.97	13.6
		75.0	0.046	0.48	0.53	14.5
ω 127_1	June 9 10 15	−0.5	0.195	2.02	2.15	15.3
		14.5	0.184	1.90	2.03	14.9
		29.5	0.161	1.67	1.79	14.6
		44.5	0.122	1.27	1.38	13.7
		59.5	0.083	0.86	0.94	13.1
		75.0	0.045	0.47	0.52	14.3
ω 127_2	June 9 10 15	−0.5	0.197	2.04	2.17	15.4
		14.5	0.182	1.89	2.02	14.8
		29.5	0.164	1.71	1.83	14.9
		44.5	0.125	1.30	1.41	14.0
		59.5	0.087	0.90	0.98	13.7
		75.0	0.044	0.46	0.51	14.0
ω 129	June 10 2 40	−0.5	0.195	2.01	2.14	15.2
		14.5	0.185	1.90	2.03	14.9
		29.5	0.166	1.70	1.82	14.8
		44.5	0.126	1.30	1.41	14.0
		59.5	0.085	0.88	0.96	13.4
		74.5	0.045	0.46	0.51	13.5
ω 130_1	June 10 2 40	−0.5	0.196	2.02	2.15	15.3
		14.5	0.184	1.90	2.03	14.9
		29.5	0.162	1.68	1.80	14.7
		44.5	0.125	1.29	1.40	13.9
		59.5	0.088	0.92	1.00	14.0
		74.5	0.046	0.47	0.52	13.8
ω 130_2	June 10 2 40	−0.5	0.196	2.02	2.15	15.3
		14.5	0.184	1.90	2.03	14.9
		29.5	0.161	1.66	1.78	14.5
		44.5	0.125	1.29	1.40	13.9
		59.5	0.083	0.86	0.94	13.1
		74.5	0.048	0.49	0.54	14.3
ω 131_1	June 10 2 40	−0.5	0.194	2.00	2.13	15.1
		14.5	0.185	1.89	2.02	14.8
		29.5	0.163	1.67	1.79	14.6
		44.5	0.125	1.30	1.41	14.0
		59.5	0.087	0.89	0.97	13.6
		74.5	0.045	0.46	0.51	13.5
ω 131_2	June 10 2 40	−0.5	0.193	1.99	2.12	15.1
		14.5	0.178	1.85	1.98	14.5
		29.5	0.158	1.62	1.74	14.2
		44.5	0.120	1.25	1.36	13.5
		59.5	0.080	0.82	0.90	12.6
		74.5	0.044	0.45	0.50	13.3
ω 141	Aug. 5 4 30	−0.3	0.193	2.01	2.14	15.2
		14.6	0.183	1.91	2.04	15.0
		29.5	0.160	1.67	1.79	14.6
		44.7	0.124	1.31	1.41	14.1
		59.9	0.086	0.91	0.98	13.9
		74.9	0.046	0.52	0.56	15.3
ω 144	Aug. 5 4 30	−0.3	0.192	2.01	2.14	15.2
		14.6	0.183	1.91	2.04	15.0
		29.5	0.160	1.67	1.79	14.6
		44.7	0.127	1.34	1.44	14.4
		59.9	0.088	0.93	1.00	14.3
		74.9	0.047	0.53	0.57	15.5
ω 171	Aug. 27 11 30	0.3	0.191	1.98	2.12	15.1
		15.2	0.183	1.90	2.03	14.9
		30.0	0.157	1.63	1.75	14.3
		45.0	0.126	1.32	1.42	14.2
		60.2	0.084	0.91	0.98	14.0
		75.0	0.048	0.57	0.60	16.4

TABLE 16.—OBSERVATIONS ON THE α LINE OF HYDROGEN AT THE LIMB. RESULTS FOR EACH LATITUDE.

ϕ	$v + v_1$	ξ	ϕ	$v + v_1$	ξ	ϕ	$v + v_1$	ξ
°	km	°	°	km	°	°	km	°
0.2	2.12	15.0	15.1	2.05	15.1	29.9	1.75	14.3
0.4	2.12	15.3	14.6	2.02	14.8	29.6	1.71	14.0
0.6	2.15	15.3	14.4	2.05	15.0	29.4	1.76	14.3
0.6	2.17	15.4	14.4	2.05	15.0	29.4	1.73	14.1
0.5	2.16	15.3	14.5	2.02	14.8	29.5	1.77	14.4
0.5	2.13	15.1	14.5	1.99	14.6	29.5	1.79	14.6
0.5	2.09	14.8	14.5	2.03	14.9	29.5	1.77	14.4
0.5	2.14	15.2	14.5	2.04	15.0	29.5	1.77	14.4
0.5	2.15	15.3	14.5	2.03	14.9	29.5	1.81	14.8
0.5	2.14	15.2	14.5	2.02	14.8	29.5	1.79	14.6
0.5	2.14	15.2	14.5	2.03	14.9	29.5	1.80	14.7
0.5	2.16	15.3	14.5	2.01	14.7	29.5	1.82	14.8
0.5	2.15	15.3	14.5	2.03	14.9	29.5	1.79	14.6
0.5	2.17	15.4	14.5	2.02	14.8	29.5	1.83	14.9
0.5	2.14	15.2	14.5	2.03	14.9	29.5	1.82	14.8
0.5	2.15	15.3	14.5	2.03	14.9	29.5	1.80	14.7
0.5	2.15	15.3	14.5	2.03	14.9	29.5	1.78	14.5
0.5	2.13	15.1	14.5	2.02	14.8	29.5	1.79	14.6
0.5	2.12	15.1	14.5	1.98	14.5	29.5	1.74	14.2
0.3	2.14	15.2	14.6	2.04	15.0	29.5	1.79	14.6
0.3	2.14	15.2	14.6	2.04	15.0	29.5	1.76	14.6
0.3	2.12	15.1	15.2	2.03	14.9	30.0	1.75	14.3
Means, 0.46	2.145	15.21	14.56	2.027	14.89	29.54	1.783	14.51

ϕ	$v + v_1$	ξ	ϕ	$v + v_1$	ξ	ϕ	$v + v_1$	ξ
°	km	°	°	km	°	°	km	°
44.3	1.45	14.4	60.4	0.96	13.8	75.2	0.54	15.0
44.9	1.39	13.9	65.3	0.82	13.9	75.9	0.48	14.0
44.9	1.51	15.1	60.5	0.94	13.6	75.9	0.49	14.3
44.9	1.43	14.3	60.4	0.95	13.6	75.9	0.52	15.2
44.5	1.42	14.1	60.4	0.96	13.8	75.0	0.48	13.2
44.5	1.35	13.4	59.5	0.96	13.4	75.0	0.49	13.4
44.5	1.31	13.0	59.5	0.93	13.0	75.0	0.52	14.3
44.5	1.39	13.8	59.5	0.99	13.8	75.0	0.52	14.3
44.5	1.41	14.0	59.5	0.97	13.6	75.0	0.50	13.7
44.5	1.44	14.3	59.5	0.92	12.9	75.0	0.48	13.2
44.5	1.41	14.0	59.5	0.96	13.4	75.0	0.50	13.7
44.5	1.43	14.1	59.5	0.94	13.1	75.0	0.53	14.5
44.5	1.38	13.7	59.5	0.97	13.6	75.0	0.52	14.3
44.5	1.41	14.0	59.5	0.94	13.1	75.0	0.51	14.0
44.5	1.41	14.0	59.5	0.98	13.7	74.5	0.51	13.5
44.5	1.40	13.9	59.5	0.96	13.4	74.5	0.52	13.8
44.5	1.40	13.9	59.5	1.00	14.0	74.5	0.54	14.3
44.5	1.41	14.0	59.5	0.94	13.1	74.5	0.51	13.5
44.5	1.36	13.5	59.5	0.97	13.6	74.5	0.50	13.3
44.7	1.41	14.1	59.5	0.90	12.6	74.9	0.56	15.3
44.7	1.44	14.4	59.9	0.98	13.9	74.9	0.57	15.5
45.0	1.42	14.2	59.9	1.00	14.3	75.0	0.60	16.4
...	...	...	60.2	0.98	14.0	...	...	...
Means, 44.59	1.408	14.00	59.89	0.953	13.53	75.00	0.517	14.20

TABLE 17.—OBSERVATIONS ON THE α LINE OF HYDROGEN WITHIN THE LIMB.

PLATE No.	GR. MEAN DATE.	ϕ	Δ	v	$v+v_1$	ξ	PLATE No.	GR. MEAN DATE.	ϕ	Δ	v	$v+v_1$	ξ
	1908 h m	°		km	km	°		1808 h m	°		km	km	°
ω 116	May 15 6 30	0.1	0.188	2.03	2.17	15.4	ω 138	Aug. 4 12 30	0.4	0.182	1.95	2.08	14.8
		14.9	0.176	1.90	2.03	14.9			14.3	0.174	1.87	2.00	14.7
		29.9	0.151	1.63	1.75	14.3			30.2	0.150	1.61	1.72	14.1
		45.1	0.120	1.30	1.41	14.2			45.4	0.116	1.26	1.36	13.8
		60.8	0.078	0.84	0.92	13.4			60.6	0.070	0.80	0.87	12.6
		76.2	0.038	0.42	0.47	14.0			75.7	0.038	0.41	0.45	12.9
$\omega\ 119_1$	June 1 0 40	−0.6	0.184	1.99	2.12	15.1	ω 142	Aug. 5 4 30	−0.3	0.187	2.00	2.13	15.1
		14.4	0.175	1.89	2.02	14.8			14.6	0.177	1.90	2.03	14.9
		29.4	0.148	1.60	1.72	14.0			29.5	0.151	1.63	1.75	14.3
		44.9	0.119	1.28	1.38	13.8			44.7	0.121	1.30	1.40	14.0
		60.4	0.076	0.82	0.89	12.8			59.9	0.080	0.87	0.94	13.3
		75.9	0.037	0.40	0.44	12.8			74.9	0.038	0.44	0.48	13.1
$\omega\ 119_2$	June 1 0 40	−0.6	0.184	1.99	2.12	15.1	ω 143	Aug. 5 4 30	−0.3	0.186	1.99	2.12	15.0
		14.4	0.172	1.86	1.99	14.6			14.6	0.174	1.86	1.99	14.6
		29.4	0.148	1.60	1.72	14.0			29.5	0.148	1.59	1.72	14.0
		44.9	0.119	1.28	1.38	13.8			44.7	0.118	1.23	1.33	13.3
		60.4	0.074	0.80	0.87	12.5			59.9	0.080	0.86	0.93	13.2
		75.9	0.036	0.39	0.43	12.5			74.9	0.040	0.47	0.51	13.9
ω 137	Aug. 4 12 30	0.4	0.184	1.97	2.10	14.9	ω 172	Aug. 27 11 30	0.3	0.179	1.93	2.06	14.6
		14.3	0.174	1.86	1.99	14.6			15.2	0.173	1.85	1.98	14.6
		30.2	0.145	1.61	1.72	14.1			30.0	0.146	1.59	1.71	14.0
		45.4	0.120	1.29	1.39	14.0			45.0	0.116	1.27	1.37	13.8
		60.6	0.073	0.80	0.87	12.6			60.2	0.077	0.86	0.93	13.3
		75.7	0.038	0.41	0.45	12.9			75.0	0.040	0.49	0.52	14.3

TABLE 18.—OBSERVATIONS ON THE α LINE OF HYDROGEN WITHIN THE LIMB. RESULTS FOR EACH LATITUDE.

ϕ	$v+v_1$	ξ	ϕ	$v+v_1$	ξ	ϕ	$v+v_1$	ξ
°	km	°	°	km	°	°	km	°
0.1	2.17	15.4	14.9	2.03	14.9	29.9	1.75	14.3
0.6	2.12	15.1	14.4	2.02	14.8	29.4	1.72	14.0
0.6	2.12	15.1	14.4	1.99	14.6	29.4	1.72	14.0
0.4	2.10	14.9	14.3	1.99	14.6	30.2	1.72	14.1
0.4	2.08	14.8	14.3	2.00	14.7	30.2	1.72	14.1
0.3	2.13	15.1	14.6	2.03	14.9	29.5	1.75	14.3
0.3	2.12	15.0	14.6	1.99	14.6	29.5	1.72	14.0
0.3	2 06	14.6	15.2	1.98	14.6	30.0	1.71	14.0
Means, 0.4	2.112	15.00	14.6	2.004	14.71	29.8	1.726	14.10

ϕ	$v+v_1$	ξ	ϕ	$v+v_1$	ξ	ϕ	$v+v_1$	ξ
°	km	°	°	km	°	°	km	°
45.1	1.41	14.2	60.8	0.92	13.4	76.2	0.47	14.0
44.9	1.38	13.8	60.4	0.89	12.8	75.9	0.44	12.8
44.9	1.38	13.8	60.4	0.87	12.5	75.9	0.43	12.5
45.4	1.39	14.0	60.6	0.87	12.6	75.7	0.45	12.9
45.4	1.36	13.8	60.6	0.87	12.6	75.7	0.45	12.9
44.9	1.40	14.0	59.9	0.94	13.3	74.9	0.48	13.1
44.7	1.33	13.3	59.9	0.93	13.2	74.9	0.51	13.9
45.0	1.37	13.8	60.2	0.93	13.3	75.0	0.52	14.3
Means, 45.0	1.378	13.84	60.4	0.902	12.96	75.5	0.469	13.30

10. Special Observations on λ 4227 of Calcium.

The line λ 4227 of calcium appears upon all of the plates taken for the investigation of the rotation of the sun with the lines of the reversing layer. The quality of these negatives, however, is not well adapted for the study of this line, which is very diffuse and has broad wings extending on either side. Accordingly, I have taken a separate series of plates in which the density is made sufficiently great to reduce these wings considerably and thus define the central portion of the line to somewhat better advantage. In spite of this fact its measurement is difficult, and it is doubtful whether the degree of accuracy attained is any higher than in the case of *Hα*.

In Tables 19 and 20 are found the details of the observations and a summary of the results. The values for the normal places are collected and compared with those for the reversing layer in Table 36.

Table 19.—Observations on λ 4227 of Calcium.

Plate No.	Gr. Mean Date.	ϕ	Δ	v	$v+v_1$	ξ	Plate No.	Gr. Mean Date.	ϕ	Δ	v	$v+v_1$	ξ
	1908 h m	°		km	km	°		1908 h m	°		km	km	°
ω 149	Aug. 5 11 40	0.4	0.182	1.97	2.10	14.9	ω 167	Aug. 27 7 0	0.6	0.184	2.01	2.15	15.3
		15.5	0.172	1.87	2.00	14.7			15.0	0.176	1.92	2.05	15.1
		30.2	0.150	1.63	1.75	14.4			29.8	0.152	1.67	1.79	14.6
		45.6	0.111	1.21	1.31	13.3			44.8	0.119	1.30	1.40	14.0
		60.8	0.070	0.77	0.84	12.2			60.0	0.074	0.85	0.92	13.1
		75.5	0.036	0.44	0.48	13.6			74.8	0.038	0.42	0.46	12.5
ω 150	Aug. 5 11 40	0.4	0.180	1.95	2.08	14.8	ω 168	Aug. 27 7 0	0.6	0.182	1.98	2.12	15.0
		15.3	0.172	1.86	1.99	14.6			15.0	0.176	1.91	2.04	15.0
		30.2	0.147	1.60	1.72	14.1			29.8	0.150	1.64	1.76	14.4
		45.6	0.111	1.21	1.31	13.3			44.8	0.119	1.30	1.40	14.0
		60.8	0.068	0.75	0.82	11.9			60.0	0.077	0.85	0.92	13.1
		75.5	0.035	0.42	0.46	13.0			74.8	0.044	0.54	0.58	15.7
ω 152	Aug. 6 5 40	0.3	0.185	2.01	2.14	15.2	ω 169	Aug. 27 7 0	0.6	0.184	2.01	2.15	15.3
		15.2	0.171	1.85	1.98	14.6			15.0	0.176	1.92	2.03	14.9
		30.1	0.148	1.62	1.74	14.3			29.8	0.152	1.62	1.74	14.2
		45.2	0.112	1.22	1.32	13.3			44.8	0.118	1.29	1.39	13.9
		60.4	0.072	0.79	0.86	12.4			60.0	0.074	0.82	0.89	12.6
		75.4	0.034	0.41	0.45	12.7			74.8	0.043	0.53	0.57	15.4
ω 153	Aug. 6 5 40	0.3	0.183	1.99	2.12	15.1	ω 170	Aug. 27 7 0	0.6	0.186	2.02	2.16	15.3
		15.2	0.171	1.86	1.99	14.6			15.0	0.176	1.92	2.05	15.1
		30.1	0.148	1.64	1.76	14.4			29.8	0.149	1.63	1.75	14.3
		45.2	0.112	1.22	1.32	13.3			44.8	0.120	1.32	1.42	14.2
		60.4	0.070	0.77	0.84	12.1			60.0	0.080	0.89	0.96	13.6
		75.4	0.033	0.39	0.43	12.1			74.8	0.042	0.51	0.55	14.9
ω 154	Aug. 6 5 40	0.3	0.180	1.97	2.10	14.9	ω 188	Oct. 22 10 30	−0.1	0.184	1.99	2.13	15.1
		15.2	0.174	1.89	2.02	14.9			14.8	0.172	1.86	2.00	14.7
		30.1	0.148	1.64	1.76	14.4			29.8	0.153	1.66	1.79	14.6
		45.2	0.114	1.23	1.33	13.4			44.9	0.115	1.25	1.36	13.6
		60.4	0.067	0.74	0.81	11.6			60.2	0.075	0.79	0.87	12.4
		75.4	0.032	0.38	0.42	11.8			75.9	0.039	0.45	0.49	14.3
									−0.1	0.181	1.96	2.10	14.9
ω 157	Aug. 13 5 10	−0.3	0.184	1.99	2.13	15.1	ω 189	Oct. 22 10 30	14.8	0.175	1.88	2.02	14.8
		14.6	0.176	1.91	2.04	15.0			29.8	0.154	1.67	1.80	14.7
		29.5	0.147	1.59	1.71	13.9			44.9	0.118	1.28	1.39	13.9
		44.1	0.116	1.26	1.36	13.4			60.2	0.079	0.85	0.93	13.3
		58.4	0.073	0.81	0.89	12.0			75.9	0.037	0.44	0.48	14.0
		72.0	0.037	0.42	0.47	10.8							
ω 158	Aug. 13 5 10	−0.3	0.182	1.97	2.11	15.0							
		14.6	0.176	1.91	2.04	15.0							
		29.5	0.146	1.58	1.70	13.9							
		44.1	0.114	1.23	1.33	13.1							
		58.4	0.074	0.81	0.89	12.0							
		72.0	0.041	0.48	0.53	12.2							

TABLE 20.—OBSERVATIONS ON λ 4227 OF CALCIUM. RESULTS FOR EACH LATITUDE.

ϕ	$v+v_1$	ξ	ϕ	$v+v_1$	ξ	ϕ	$v+v_1$	ξ
°	km	°	°	km	°	°	km	°
0.4	2.10	14.9	15.3	2.00	14.7	30.2	1.75	14.4
0.4	2.08	14.8	15.3	1.99	14.6	30.2	1.72	14.1
0.3	2.14	15.2	15.2	1.98	14.6	30.1	1.74	14.3
0.3	2.12	15.1	15.2	1.99	14.6	30.1	1.76	14.4
0.3	2.10	14.9	15.2	2.02	14.9	30.1	1.76	14.4
0.3	2.13	15.1	14.6	2.04	15.0	29.5	1.71	13.9
0.3	2.11	15.0	14.6	2.04	15.0	29.5	1.70	13.9
0.6	2.15	15.3	15.0	2.05	15.1	29.8	1.79	14.6
0.6	2.12	15.0	15.0	2.04	15.0	29.8	1.76	14.4
0.6	2.15	15.3	15.0	2.03	14.9	29.8	1.74	14.2
0.6	2.16	15.3	15.0	2.05	15.1	29.8	1.75	14.3
0.1	2.13	15.1	14.8	2.00	14.7	29.8	1.79	14.6
0.1	2.10	14.9	14.8	2.02	14.8	29.8	1.80	14.7
Means, 0.38	2.122	15.07	15.00	2.019	14.85	29.88	1.752	14.32

ϕ	$v+v_1$	ξ	ϕ	$v+v_1$	ξ	ϕ	$v+v_1$	ξ
°	km	°	°	km	°	°	km	°
45.6	1.31	13.3	60.8	0.84	12.2	75.5	0.48	13.6
45.6	1.31	13.3	60.8	0.82	11.9	75.5	0.46	13.0
45.2	1.32	13.3	60.4	0.86	12.4	75.4	0.45	12.7
45.2	1.32	13.3	60.4	0.84	12.1	75.4	0.43	12.1
45.2	1.33	13.4	60.4	0.81	11.6	75.4	0.42	11.8
44.1	1.36	13.4	58.4	0.89	12.0	72.0	0.47	10.8
44.1	1.33	13.1	58.4	0.89	12.0	72.0	0.53	12.2
44.8	1.40	14.0	60.0	0.92	13.1	74.8	0.46	12.5
44.8	1.40	14.0	60.0	0.92	13.1	74.8	0.58	15.7
44.8	1.39	13.9	60.0	0.89	12.6	74.8	0.57	15.4
44.8	1.42	14.2	60.0	0.96	13.6	74.8	0.55	14.9
44.9	1.36	13.6	60.2	0.87	12.4	75.9	0.49	14.3
44.9	1.39	13.9	60.2	0.93	13.3	75.9	0.48	14.0
Means, 44.92	1.357	13.52	60.00	0.880	12.48	74.78	0.490	13.31

DISCUSSION OF THE RESULTS.

11. Systematic Deviations of Velocity of Rotation derived from Various Lines of the Reversing Layer.

One of the most important questions connected with the results of this investigation is whether the lines of different elements give values which differ from one another in any systematic way, indicating a longer or shorter period of rotation for the various elements in the sun's atmosphere. The behavior of the individual lines in this regard will be shown best if we form the difference in the value of the angular velocity of ξ for each line from that of the mean of all the lines. Any systematic effect will show itself at once by the marked preponderance of the positive or the negative sign in the residuals. The results of such a comparison are given for the two series of observations in Tables 21 and 22. In forming these differences I have rounded off the results to one place of decimals, although the reduction tables have been carried to two places. This has seemed desirable in order to facilitate rapid comparison of the results. In the formation of the mean deviations for several latitudes, however, the second place has been retained.

An examination of these tables leads to several important conclusions. The most striking of these are, on the one hand, the systematically low values given by the lanthanum line at λ 4196.699, the cyanogen lines λ 4197.257 and λ 4216.136, and the enhanced line of titanium at λ 4290.377; and, on the other hand, the high values given by λ 4257.815 and possibly one or two other lines in the list. The evidence for concluding that lanthanum and cyanogen occupy a relatively low level in the sun's atmosphere has already been referred to in connection with the discussion of the selection of the lines chosen for measurement. In the case of lanthanum reference should be made to an additional point of evidence, namely, that its lines, like those of other elements of very high atomic weight, are much weakened at the sun's limb. The fact, accordingly, that the lines of cyanogen and lanthanum give consistently low values for the angular velocity of rotation indicates that the sun's period of rotation increases as we approach its surface, or that the outer layers of the solar atmosphere move more rapidly than those lying close to the photosphere. This is in agreement with the results found for hydrogen and other substances which rise to a great height above the solar surface, and to which extended reference will be made later.

Table 21.—Deviations of Angular Velocity for Individual Lines from Mean Value. Observations of 1906–1907.

λ	Element.	0°.2	7°.7	15°.0	22°.7	29°.8	37°.8	44°.6	52°.7	59°.6	65°.6	75°.1	80°.4
		°	°	°	°	°	°	°	°	°	°	°	°
4196.699	*La*	0.0	0.0	−0.1	−0.1	−0.1	−0.2	−0.2	−0.3	−0.4	−0.3	−0.8	−0.3
4197.257	*CN*	0.0	0.0	0.0	−0.1	0.0	−0.2	−0.1	−0.3	−0.2	−0.3	−0.8	−0.4
4203.730	*Cr*	+0.2	+0.1	+0.1	0.0	+0.1	0.0	0.0	0.0	+0.1	0.0	+0.2	+0.2
4209.144	*Zr*	+0.2	+0.1	+0.1	+0.1	+0.2	+0.1	+0.2	0.0	+0.2	+0.1	+0.1	+0.1
4216.136	*CN*	−0.1	0.0	−0.1	−0.1	−0.2	−0.1	−0.2	−0.3	−0.2	−0.4	−0.8	−0.3
4220.509	*Fe*	+0.1	+0.1	+0.1	+0.1	+0.2	+0.1	+0.1	0.0	0.0	0.0	+0.2	+0.4
4232.887	*Fe*	+0.1	+0.1	+0.1	+0.1	+0.1	0.0	0.0	0.0	+0.1	+0.1	+0.1	+0.1
4257.815	*Mn*	+0.1	+0.2	+0.1	+0.2	+0.2	+0.2	+0.2	+0.2	+0.2	+0.3	+0.6	+0.3
4258.477	*Fe*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	+0.2	+0.1	+0.2	−0.4
4265.418	*Fe*	0.0	0.0	+0.1	0.0	0.0	0.0	0.0	0.0	+0.1	0.0	0.0	0.0
4266.081	*Mn*	0.0	+0.1	0.0	+0.1	+0.1	+0.1	+0.1	+0.2	+0.2	+0.2	+0.5	+0.4
4268.915	*Fe*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	+0.2	+0.1	0.0
4276.826	*-Zr*	0.0	+0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	+0.1	0.0	0.0
4284.838	*Ni*	0.0	−0.1	0.0	0.0	−0.1	0.0	0.0	+0.1	0.0	0.0	0.0	0.0
4287.566	*Ti*	0.0	−0.1	0.0	0.0	−0.1	0.0	0.0	0.0	+0.1	+0.1	+0.1	+0.1
4288.310	*Ti, Fe*	0.0	−0.1	−0.1	0.0	0.0	0.0	−0.1	+0.1	0.0	0.0	+0.1	0.0
4290.377	*Ti*	−0.2	−0.2	−0.1	−0.1	−0.1	−0.1	−0.1	+0.1	−0.1	0.0	−0.1	−0.4
4290.542	*Fe*	−0.1	−0.1	−0.1	0.0	−0.1	0.0	−0.1	0.0	−0.1	0.0	+0.1	−0.1
4291.630	*Fe*	−0.1	−0.1	−0.1	−0.1	−0.1	0.0	0.0	0.0	−0.1	+0.1	+0.4	0.0
4294.936	*Zr*	−0.1	−0.1	−0.1	−0.1	−0.1	0.0	0.0	+0.1	+0.1	0.0	0.0	0.0

TABLE 22.—DEVIATIONS OF ANGULAR VELOCITY FOR INDIVIDUAL LINES FROM MEAN VALUE. OBSERVATIONS OF 1908.

λ	ELEMENT.	$0^\circ.4$	$4^\circ.1$	$11^\circ.2$	$14^\circ.9$	$19^\circ.2$	$29^\circ.8$	$34^\circ.1$	$44^\circ.8$	$49^\circ.6$	$60^\circ.1$	$65^\circ.0$	$75^\circ.0$	$79^\circ.1$
		°	°	°	°	°	°	°	°	°	°	°	°	°
4196.699	*La*	−0.2	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1	−0.2	−0.2	−0.4	−0.2
4197.257	*CN*	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1	−0.2	−0.2	−0.3	−0.1
4203.730	*Cr*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	−0.1	−0.1
4207.566	*CN*	0.0	0.0	0.0	0.0	+0.1	0.0	0.0	0.0	0.0	0.0	−0.1	−0.5	−0.1
4216.136	*CN*	−0.1	−0.1	−0.1	−0.1	0.0	−0.2	−0.1	−0.2	−0.1	−0.1	−0.2	−0.3	−0.4
4220.509	*Fe*	0.0	0.0	0.0	0.0	0.0	0.0	+0.1	0.0	+0.1	0.0	0.0	+0.1	−0.2
4232.887	*Fe*	0.0	0.0	0.0	0.0	+0.1	0.0	0.0	−0.1	0.0	−0.1	0.0	0.0	−0.3
4233.328	*Mn*	0.0	+0.1	0.0	0.0	+0.1	0.0	0.0	0.0	0.0	0.0	0.0	−0.3	−0.2
4257.815	*Mn*	+0.1	0.0	0.0	+0.1	+0.1	+0.1	+0.1	+0.1	+0.1	+0.1	+0.1	+0.3	+0.3
4258.477	*Fe*	0.0	0.0	0.0	+0.1	0.0	+0.1	0.0	+0.1	0.0	0.0	0.0	+0.1	+0.2
4265.418	*Fe*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	+0.2
4266.081	*Mn*	+0.1	+0.1	0.0	0.0	0.0	+0.1	0.0	+0.1	0.0	0.0	+0.1	+0.2	+0.3
4268.915	*Fe*	+0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	+0.1	+0.2	+0.2	+0.2
4276.836	*-Zr*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	+0.1	0.0	+0.2	+0.1
4283.169	*Ca*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	+0.1	0.0	0.0	0.0
4283.838	*Ni*	0.0	0.0	0.0	−0.1	−0.1	−0.1	0.0	−0.1	0.0	0.0	0.0	+0.2	−0.1
4287.566	*Ti*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	−0.1	0.0	+0.1	0.0
4288.310	*Ti, Fe*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	+0.1	0.0	+0.1	+0.3
4289.525	*Ca*	0.0	0.0	0.0	0.0	0.0	+0.1	0.0	+0.1	+0.1	0.0	+0.1	+0.1	+0.2
4290.377	*Ti*	0.0	0.0	0.0	0.0	−0.1	0.0	0.0	−0.1	0.0	−0.1	0.0	−0.1	−0.1
4290.542	*Fe*	0.0	0.0	0.0	+0.1	0.0	+0.1	+0.1	+0.1	0.0	+0.1	+0.1	+0.2	−0.1
4291.630	*Fe*	+0.1	0.0	0.0	0.0	0.0	+0.1	0.0	+0.1	+0.1	+0.1	+0.1	+0.1	+0.2

The agreement of the two series of observations as regards the amount of this effect in the lower latitudes is excellent. The 1906–1907 observations give −0.10 for the lanthanum line between 0° and 45° of latitude, and the 1908 observations give $-0^\circ.11$. Similarly for the mean of the cyanogen lines the earlier observations give $-0^\circ.09$ and the later observations $-0^\circ.11$. A difference of $-0^\circ.10$ in the value of the angular velocity at the equator would correspond to a difference in the rotation period of about 0.17 day.

The enhanced line of titanium at λ 4290.377 is of especial interest. It is well known from observations of the spectrum of the chromosphere that the enhanced lines, as a class, are relatively much more prominent in the chromosphere than they are in the ordinary solar spectrum. This would apparently indicate a higher average level in the sun's atmosphere. On the other hand, the line is considerably shifted at the limb of the sun,* and this points to a relatively low level. The systematically low value of the angular velocity of rotation furnishes additional evidence in the same direction. Further evidence is afforded on this subject by the only other enhanced line in either list, that due to iron, λ 4233.328. The mean value of ξ in its case agrees closely with the mean derived from all the lines. Since it is a very prominent chromospheric line, however, the fact that it does not give a large value for the angular rate of rotation is strong evidence that it does not originate at any very considerable height in the sun's atmosphere. The explanation of this apparent discrepancy of results is not at present clear. It seems fairly probable that the difficulty will be found to be due to the interpretation of the chromospheric results, and that the relative strength of the enhanced lines does not necessarily indicate a higher level in the solar atmosphere. One hypothesis founded on this basis was published by Evershed in 1900 (18). Another possible explanation is indicated by some preliminary results obtained by Mr. Gale and myself while working on the displacements in the spectrum of a spark under pressure, but considerable additional material will be necessary to give it adequate weight.

Of the lines which give positive residuals, that due to manganese at λ 4257.815 is the most prominent in both series of observations. This line is not a chromospheric line, at least of any considerable intensity, nor is it much affected at the sun's limb. In sun-spots it is slightly strengthened. There is some evidence in both sets of observations, especially in the earlier, that λ 4266.081 gives similar results. It is included

* In referring to shifts at the sun's limb, the differential shift compared with the center of the sun as freed from rotational displacements is always understood. For convenience we may designate it as "pressure" shift, although pressure alone is probably not sufficient to account for all the effects observed.

as a chromospheric line in some lists, but is of comparatively slight intensity. The three lines in the list which are most strengthened at the sun's limb, λ 4232.887, λ 4258.477, and λ 4291.630, all give values close to the mean, with a very slight tendency toward positive residuals. Reference should also be made to the line at λ 4207.566. This is assigned in Rowland's table to iron, but in the list of corrections is transferred to carbon. Its appearance is strongly indicative of a compound origin, as it is much wider than other lines of the same intensity in its vicinity. At the limb of the sun it shows a considerable displacement — so much larger, in fact, than other neighboring cyanogen lines as to make its composite character almost certain. Accordingly, the evidence afforded by this line can not be considered as contradictory to that of the other cyanogen lines in the list.

12. Increase of Deviations in Higher Latitudes.

Another possible conclusion of great importance is afforded by an inspection of these tables, but it should be accepted with considerable caution. This is the apparent increase in the amount of the deviations for such lines as show systematically large or small values of the angular velocity toward the sun's pole. Thus the average deviation from the mean for the two cyanogen lines λ 4197.257 and λ 4216.136 between latitudes 60° and 80° is $-0\overset{\circ}{.}3$ as against $-0\overset{\circ}{.}1$ between latitudes 0° and 20°. Similarly the lanthanum line λ 4196.699 gives $-0\overset{\circ}{.}3$ against $-0\overset{\circ}{.}1$, while the manganese line λ 4257.815 gives $+0\overset{\circ}{.}3$ against $+0\overset{\circ}{.}1$. The 1908 observations give considerably smaller values for these differences than do the earlier results, but the effect is still well marked, the values in the higher latitudes amounting to more than twice those near the equator. It is of course true that a very small difference in linear velocity in the higher latitudes corresponds to a large difference in angular velocity, and so a wider range is to be expected among the values for the individual lines. For example, at the equator a change in the linear velocity of 0.01 km corresponds to $0\overset{\circ}{.}07$ in the angular velocity, while at 80° of latitude it corresponds to $0\overset{\circ}{.}41$. If due to this cause, however, we should expect the values of the differences in the higher latitudes to be both larger and smaller than those near the equator and not to exhibit this systematic increase. In spite of this effect, the evidence might be considered rather doubtful if it were not for the strong support afforded by the behavior of two lines of elements which rise to a great height in the sun's atmosphere. These are the *a* line of hydrogen and λ 4227 of calcium. The results for these lines will be considered in detail at a later point in this discussion, though the evidence furnished by them regarding changes of rotation rate in the higher latitudes properly belongs here. In the brief accompanying table are given the differences for such lines as show systematically large or small values of the angular velocity from a mean obtained from all the lines in the reversing-layer list.

λ	Element.	Latitude 0° – 20°	Latitude 60° – 80°
		°	°
4196.699	*La*	− 0.1	− 0.3
4197.257 } 4216.136 }	*CN*	− 0.1	− 0.3
4257.815	*Mn*	+ 0.1	+ 0.3
4226.904	*Ca*	+ 0.4	+ 1.6
6563.045	*H*	+ 0.6	+ 2.8

The great increase in the value of ξ in the case of the last two lines is most striking, and in spite of the relatively low degree of accuracy attained in the measurement of these lines as compared with those of the reversing layer, such differences as these must certainly be considered as real. Accordingly, we may say that there is a strong presumption for concluding that, in the case of lines showing relatively large or small velocities at the equator, the values of deviations from the mean increase in the higher latitudes. It is of interest to note that the variations in angular velocity which Halm believed he had discovered during the different years included in his observations were greatest toward the pole.

13. Mean Results for the Reversing Layer — Variability of the Solar Rotation — Comparison of Results with those of Other Observers.

We may now pass on to an investigation of the general results. While it appears clear from the preceding considerations that certain lines in the list give values which are systematically high or low, the number of lines of the two kinds seems to be so nearly equal that no appreciable error from this source will affect the mean taken from all the lines. If we form means of the results of the two series of observations for the normal points of latitude indicated in Tables 6 and 13, we obtain the values given in Table 23. The weights are according to the number of observations. The results are shown graphically in Fig. 1, the dotted curve corresponding to the 1906–1907 observations and the full-line curve to the 1908 observations. In each case the agreement of the points with the curve is excellent, the largest deviation falling at the points of lowest weight.

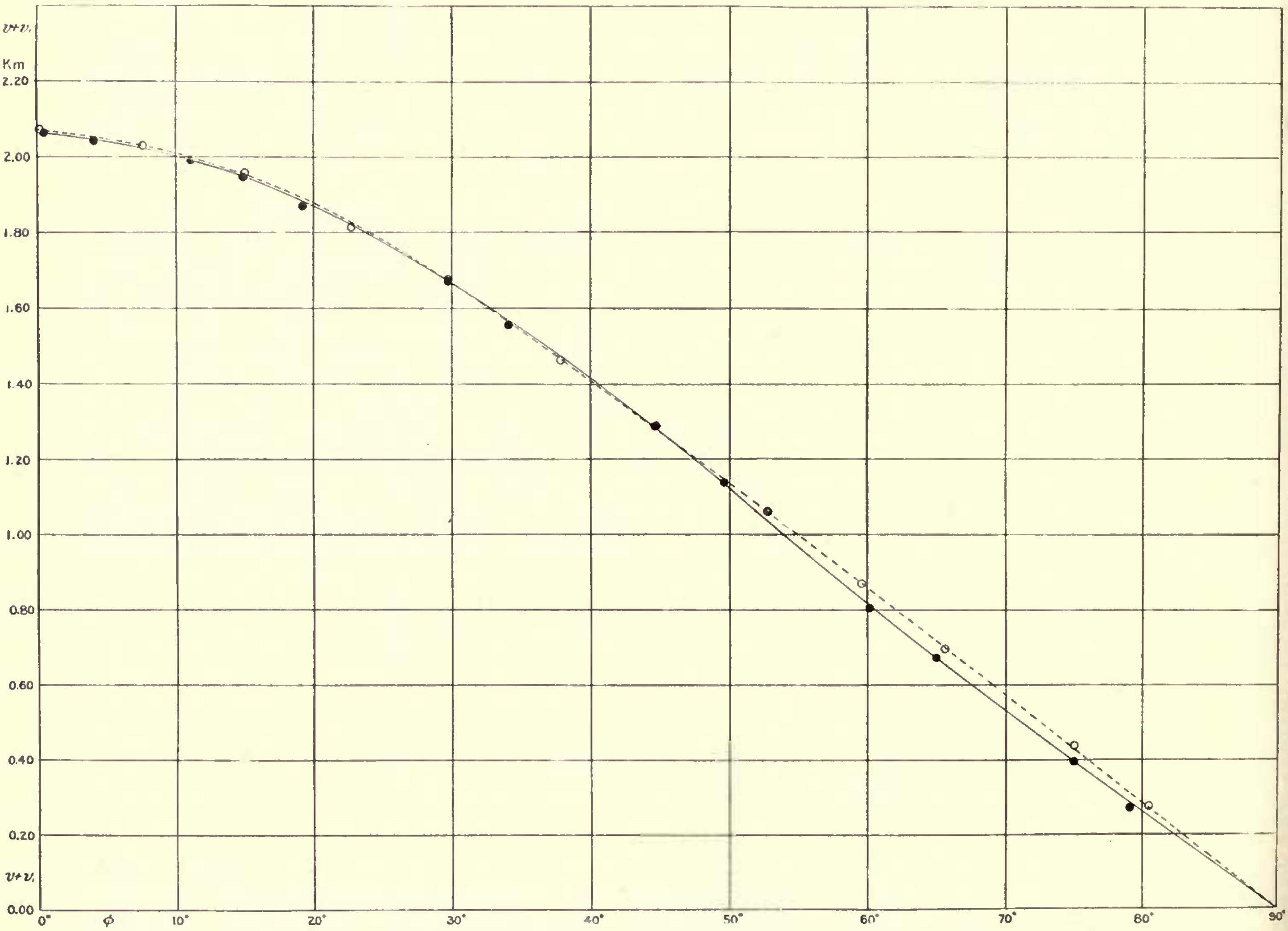


Fig. 1. — Curves representing the variation of radial velocity with heliographic latitude for the two series of observations 1906–1907 and 1908. The broken-line curve represents the 1906–1907 observations, the full-line curve those of 1908.

TABLE 23.—MEAN RESULTS FOR THE REVERSING LAYER.

Observations of 1906–1907.					Observations of 1908.				
ϕ	Weight.	$v+v_1$	ξ	Period.	ϕ	Weight.	$v+v_1$	ξ	Period.
°		km	°	days	°		km	°	days
0.2	21	2.074	14.73	24.44	0.4	21	2.062	14.64	24.59
7.7	15	2.028	14.53	24.77	4.1	15	2.040	14.53	24.78
15.0	24	1.957	14.40	25.00	11.2	12	1.991	14.40	25.00
22.7	13	1.811	13.94	25.82	14.9	18	1.944	14.28	25.21
29.8	24	1.676	13.71	26.26	19.2	14	1.867	14.04	25.64
37.8	16	1.461	13.13	27.42	29.8	16	1.669	13.65	26.37
44.6	23	1.283	12.80	28.12	34.1	15	1.557	13.35	26.96
52.7	18	1.060	12.43	28.96	44.8	17	1.287	12.87	27.97
59.6	24	0.867	12.15	29.63	49.6	16	1.137	12.45	28.92
65.6	20	0.694	11.96	30.10	60.1	22	0.806	11.49	31.33
75.1	33	0.435	11.98	30.05	65.0	17	0.671	11.30	31.86
80.4	11	0.277	11.80	30.51	75.0	17	0.396	10.86	33.15
					79.1	7	0.272	10.25	35.12

The most interesting question involved in these results is whether an actual variation in the sun's rate of rotation is indicated. To facilitate direct comparison the values from the two series of observations for every 5° of latitude are given in Table 24. They are obtained from empirical formulæ which satisfy the observations closely. The derivation of these formulæ will be indicated later in the discussion.

TABLE 24.—COMPARISON OF THE RESULTS FOR THE TWO SERIES.

ϕ	$v+v_1$			ξ		
	1906–1907	1908	Difference.	1906–1907	1908	Difference.
°	km	km	km	°	°	°
0	2.064	2.053	+0.011	14.63	14.61	+0.02
5	2.052	2.041	+0.011	14.60	14.58	+0.02
10	2.015	2.006	+0.009	14.51	14.49	+0.02
15	1.956	1.947	+0.009	14.37	14.34	+0.03
20	1.877	1.869	+0.008	14.18	14.14	+0.04
25	1.779	1.772	+0.007	13.94	13.89	+0.05
30	1.666	1.660	+0.006	13.68	13.60	+0.08
35	1.542	1.534	+0.008	13.39	13.28	+0.11
40	1.409	1.399	+0.010	13.10	12.94	+0.16
45	1.272	1.258	+0.014	12.81	12.59	+0.22
50	1.132	1.114	+0.018	12.54	12.24	+0.30
55	0.992	0.968	+0.024	12.30	11.90	+0.40
60	0.852	0.822	+0.030	12.11	11.58	+0.53
65	0.713	0.678	+0.035	11.97	11.29	+0.68
70	0.576	0.537	+0.039	11.90	11.04	+0.86
75	0.437	0.400	+0.037	11.91	10.84	+1.07

An inspection of these results shows that the 1908 observations give slightly smaller values than the earlier series between latitudes 0° and 40°, and decidedly smaller values between 45° and 80°. In the lower latitudes the largest difference is at the equator and amounts to 0.011 km for $v+v_1$. Although this is perhaps larger than might be expected from the internal agreement of the measures, it is hardly sufficient to warrant the conclusion that a source of systematic error is present, or that any variation in the sun's rate of rotation is indicated.

In the higher latitudes the case is somewhat different, however. At latitude 70° a maximum difference of 0.039 km is reached, a quantity which is decidedly larger than would be expected from errors of measure-

ment alone, even though it has been found that such errors are usually greater in high latitudes. At present it does not seem possible to decide whether this lack of agreement is due to a real variation in the sun's rate of rotation, to the presence of some source of systematic error in the observations, or to the disturbing effect of proper motions in the sun's reversing layer. I am inclined, however, to ascribe it mainly to small systematic errors in the earlier series of observations. The principal sources of error to which these were subject have already been referred to, and there is little doubt that they must have affected the results to some extent. As several of these difficulties were eliminated, or their effect much reduced, in the later series of observations, and as the check by means of the exposure on the sun's pole was available in the later results, it is highly probable that the greater part of the difficulty is to be looked for in the earlier series. If such is the case, the single most serious cause of error is probably the astigmatism of the sun's image.

The influence of proper motion in the reversing layer may be very appreciable in its effect upon the values of the solar rotation, and it is possible that this cause may be in part accountable for the discrepancies between the two series of results. As will be shown in another place, proper motions amounting to as much as 0.2 km have been found in a disturbed region in the neighborhood of spots, and of course it is highly probable that motions of smaller amount are present frequently. The probability of their occurrence in high latitudes, however, would appear to be less than in the zones of chief spot activity.

There seem to be three main arguments against the conclusion that these results indicate an actual variation in the sun's period of rotation. The first of these is that the variation, if present, seems to be confined to the higher latitudes. It would certainly appear probable that such an effect would be marked in the zones of greatest spot activity, between 10° and 30° of latitude, and differences in these zones were found by Halm (9) in the series of observations from which he concluded the existence of such a variation. On the other hand, the values given here indicate essentially no difference for the years 1906–1907 and 1908 between 0° and 40° of latitude. We have seen, however, that all of the spectrum lines which show abnormal values of the rotational velocity, such as those of cyanogen, lanthanum, calcium, and hydrogen, appear to give the largest deviations from the normal values in the higher latitudes. Accordingly, the existence of a variation in the sun's rate of rotation which is confined to high latitudes is perhaps less anomalous than might at first appear.

A second argument against the occurrence of a variation in the sun's rotation period is the close agreement of the results given here for 1908 with Dunér's values obtained from observations extending through six years, from 1887 to 1889 and from 1899 to 1901. A comparison of the 1906–1907 and 1908 observations with those of Dunér for the six latitudes employed by him gives the results in Table 25, the values being obtained in all cases from the corresponding empirical formulæ.

TABLE 25.—COMPARISON OF THE RESULTS WITH THOSE OF DUNÉR.

ϕ	1906–1907		1908		DUNÉR.	
	$v+v_1$	ξ	$v+v_1$	ξ	$v+v_1$	ξ
°	km	°	km	°	km	°
0	2.06	14.62	2.05	14.54	2.08	14.81
15	1.96	14.38	1.95	14.32	1.97	14.53
30	1.67	13.66	1.66	13.61	1.67	13.76
45	1.27	12.77	1.26	12.64	1.26	12.70
60	0.85	12.10	0.82	11.67	0.82	11.65
75	0.44	12.00	0.40	10.96	0.40	10.88

The agreement of the 1908 observations with those of Dunér is remarkably close on the average. This is especially true in the higher latitudes, the very region in which the probability of a variation in the rotation period is mainly in question. Accordingly, we may conclude that the evidence furnished by this comparison is decidedly against the existence of such a variation.

In a discussion, however, advocating the existence of a variation in the sun's rate of rotation, Halm maintains that Dunér's observations themselves furnish evidence of such a variation (9), with a period of about three years. In comparing the Edinburgh and Upsala results, Halm has made use of Faye's formula

$$v + v_1 = (a - b \sin^2 \phi) \cos \phi$$

connecting the rotational velocity with the heliographic latitude. In this form, as will be shown later, the 1908 observations give

$$v + v_1 = (2.053 - 0.546 \sin^2 \phi) \cos \phi$$

Table 26 contains the values obtained by Halm for the coefficients a and b, with the Mount Wilson values added for comparison.

TABLE 26. — COEFFICIENTS OF THE FAYE FORMULA.

OBSERVATIONS.	DATE.	a	b
Upsala	1899.5	1.98	0.57
	1900.5	2.11	0.40
	1901.5	2.09	0.79
Edinburgh . . .	1901.7	2.06	0.70
	1902.5	1.973	0.560
	1903.5	2.036	0.251
	1904.5	2.075	0.271
	1905.5	2.039	0.245
	1906.3	2.010	0.294
Mount Wilson . .	1907.0	2.055	0.480
	1908.5	2.053	0.546

The Faye formula, as will appear later, does not fully satisfy the 1906–1907 observations, but the approximation is sufficiently close for the purposes of this comparison.

On the basis of a three-year period, with a minimum near 1902.5, it is evident that 1908.5 should also give a minimum value of a. Actually, however, it is nearly equal to the largest value obtained by Halm between 1901 and 1906. Moreover, the value of a for 1907.0 is practically identical with that for 1908.5, and decidedly larger than Halm's value for the neighboring epoch 1906.3. Similarly, the Mount Wilson values of b are much larger than would be expected from comparison with the Edinburgh results, and are decidedly opposed to the idea of a periodic variation in this quantity.

A third main objection to the conclusion that a real variation of the rotation period is indicated by the differences between the results obtained from the two series of observations is closely connected with the preceding. It is the fact that the 1908 observations are well represented by Faye's formula, while the 1906–1907 results show systematic discordances of such size as to necessitate the use of an additional constant in the equation. Since the results of Dunér and the mean values obtained by Halm are well represented by this formula, and it has additional support in the observations of the rotation period of sun-spots, it seems improbable that the discordances given by the earlier series of observations can be other than inherent in the results themselves. This is indicated by the discussion that follows.

A solution of the 1906–1907 results by least squares, weighting the observations according to their number, gives the following form of Faye's equation:

$$v + v_1 = (1.575 + 0.480 \cos^2 \phi) \cos \phi$$

This equation gives the residuals which appear in the third column of Table 27, the differences being observed − computed.

TABLE 27. — REPRESENTATION OF THE 1906–1907 OBSERVATIONS BY EMPIRICAL FORMULÆ.

ϕ	WEIGHT.	I	II	
		$\Delta(v+v_1)$	$\Delta(v+v_1)$	$\Delta\xi$
°		km	km	°
0.2	21	+0.019	+0.010	+0.10
7.7	15	0.000	−0.007	−0.03
15.0	24	+0.003	+0.001	+0.03
22.7	13	−0.018	−0.014	−0.11
29.8	24	−0.005	+0.005	+0.02
37.8	16	−0.021	−0.008	−0.10
44.6	23	−0.011	0.000	−0.03
52.7	18	−0.001	+0.004	+0.02
59.6	24	+0.009	+0.005	+0.03
65.6	20	+0.010	−0.002	0.00
75.1	33	+0.021	0.000	+0.07
80.4	11	+0.014	−0.008	−0.21

The residuals under I are so clearly systematic in character as to necessitate the addition of a term in $\cos^2\phi$. A solution by least squares with the inclusion of such a term gives the equation

$$v + v_1 = (1.791 - 0.621\cos\phi + 0.894\cos^2\phi)\cos\phi$$

The corresponding equation for the angular velocity is

$$\xi = 12\overset{\circ}{.}43 - 3\overset{\circ}{.}48\cos\phi + 5\overset{\circ}{.}68\cos^2\phi$$

The equations for $v + v_1$ and ξ are derived independently and so are not convertible into one another by a substitution. These equations give the residuals under II in Table 27, which evidently are not systematic in character. A similar solution for the 1908 observations indicates that these are satisfied by the Faye equation with sufficient accuracy. The formulæ in this case are found to be

$$v + v_1 = (1.507 + 0.546\cos^2\phi)\cos\phi \qquad \xi = 10\overset{\circ}{.}57 + 4\overset{\circ}{.}04\cos^2\phi$$

The corresponding residuals are shown in Table 28.

In the highest latitudes the angular velocity changes very rapidly with the linear, which of course accounts for the large value of the discordance in ξ at 79°.1. This point is of low weight. The residual at 44°.8 is surprisingly large for a point of such high weight. In view of the simple character of the formula, however, the size of the residuals is in general entirely satisfactory.

A comparison of the last formula with the corresponding equations of Dunér and Halm will be of interest. These are as follows:

Dunér . . . . $\xi = 10\overset{\circ}{.}60 + 4\overset{\circ}{.}21\cos^2\phi$
Halm . . . . $\xi = 12.03 + 2.50\cos^2\phi$
Adams (1908) . . $\xi = 10.57 + 4.04\cos^2\phi$

The agreement of the first term in the formulæ of Dunér and myself is remarkable, but probably is somewhat accidental. It represents, of course, the angular velocity of rotation at the sun's pole, and corresponds to a rotation period of 34.0 days.

In addition to solving each series of observations separately, I have obtained a mean result for the two sets by combining the values for closely adjoining points of latitude and solving these values by least squares with an equation of Faye's form. Equal weights have been assigned to the two series in the formation of the means and the values then weighted in the solution according to the number of observations. The results are as follows:

$$v + v_1 = (1.550 + 0.501\cos^2\phi)\cos\phi \qquad \xi = 11\overset{\circ}{.}04 + 3\overset{\circ}{.}50\cos^2\phi$$

Table 29 contains the values on which the solution is based, and the residuals (observed − computed) which are given by these two formulæ. These residuals are small in amount, and there appears to be no tendency to systematic effect in sign. This result evidently is due largely to the smoothing-out effect of the 1908 observations.

TABLE 28.—REPRESENTATION OF 1908 OBSERVATIONS BY FAYE'S FORMULA.

ϕ	WEIGHT.	$\Delta(v+v_1)$	$\Delta\xi$
°		km	°
0.4	21	+0.009	+0.03
4.1	15	−0.005	−0.06
11.2	12	−0.002	−0.06
14.9	18	−0.005	−0.06
19.2	14	−0.016	−0.13
29.8	16	+0.004	+0.04
34.1	15	0.000	+0.01
44.8	17	+0.023	+0.28
49.6	16	+0.011	+0.18
60.1	22	−0.012	−0.08
65.0	17	−0.006	−0.01
75.0	17	−0.003	+0.02
79.1	7	−0.016	−0.46

TABLE 29.—REPRESENTATION OF MEAN RESULTS FOR 1906–1907 AND 1908 BY FAYE'S FORMULA.

ϕ	$v+v_1$	$\Delta(v+v_1)$	$\Delta\xi$
°	km	km	°
0.3	2.068	+0.017	+0.13
7.6	2.019	−0.004	−0.02
15.0	1.950	+0.001	+0.02
20.9	1.839	−0.017	−0.12
29.8	1.672	−0.001	0.00
35.9	1.509	−0.011	−0.11
44.7	1.285	+0.004	+0.03
51.2	1.099	+0.003	+0.02
59.9	0.836	−0.005	−0.09
65.3	0.683	−0.001	−0.04
75.0	0.416	+0.008	+0.17
79.8	0.275	−0.003	−0.14

14. PROBABLE ERRORS.

A comparison of the probable errors of the results of these determinations with the visual observations of Dunér and Halm is rendered rather difficult by the inherent difference in the nature of the methods employed. The photographic results are based upon the measurement of a considerable number of lines, the mean values of which are combined to give a single determination of the rotational velocity. In the work of Dunér and Halm only two lines were used, but from eight to twelve settings of the micrometer wire were made upon each line. In the case of the photographic determinations four settings were made in each position of the plate under the measuring microscope. It will be sufficient for general purposes to compare the probable error for a single line on the photographic plate with the probable error for a single visual determination, taken from a series equal in number to the lines on the photographic plate. This should give a marked advantage to the visual results, since the mean of two lines is used, and a large number of settings employed on each of them. In the case of the photographic observations, however, such of the lines as give marked systematic deviations should evidently be omitted when the probable error is formed. Accordingly, six lines of this sort, the behavior of which has already been fully discussed, namely, λ 4196, λ 4197, λ 4216, λ 4257, λ 4266, and λ 4290.38, are left out of consideration. This leaves a total of fourteen lines for the 1906–1907 series and sixteen for the 1908 series. Plates taken at random from each set give the following values:

	SINGLE LINE.	MEAN VALUE FROM PLATE.
1906–1907	$r = \pm 0.015$ km	$r_0 = \pm 0.004$ km
1908	$r = \pm 0.009$	$r_0 = \pm 0.002$

A series of determinations by Halm in 1903 (8) averaging fifteen observations for each latitude give

$$r = \pm 0.070 \text{ km} \qquad r_0 = \pm 0.018 \text{ km}$$

The earlier series of observations by Dunér show probable errors about twice as large as those of Halm, but for the completed series no values are given, though they are undoubtedly considerably smaller than for the previous results. It should be noted that the photographic observations show somewhat larger probable errors in the higher latitudes.

A comparison of these values indicates a marked gain in the degree of accuracy of the photographic results over the visual. It is of course impossible to state how much of this gain is due to the more powerful spectroscopic apparatus and the larger solar image employed, and how much to the use of the photographic method, but it seems probable that both facts contribute materially to the result.

15. Comparison of Results for Sun-spots, Faculæ, Flocculi, Reversing Layer, the a Line of Hydrogen, and λ 4227 of Calcium.

At the conclusion of this discussion of the rotation of the sun as determined from the displacements of the lines in the reversing layer, it seems desirable to add a comparison with the values obtained by various observers from sun-spots, faculæ, and hydrogen and calcium flocculi. Such a comparison with the reversing layer results of Dunér and Halm has already been made by Hale and Fox in their discussion of the motion of the calcium flocculi (19), and by Hale in his paper on the motion of the hydrogen flocculi (20). In view of the additional material now available for the reversing layer, a repetition of these values will not be out of place. The quantities, which are given in Table 30, are derived from empirical formulæ where these have been obtained; in other cases they are taken from curves or found by interpolation from the original observations. In the case of the work of Carrington, Spoerer, and Maunder on sun-spots, Dunér and Halm on the reversing layer, and Adams on the reversing layer, $H\alpha$ and λ 4227, empirical formulæ are available. In the form employed for calculation they are as follows:

Carrington	$\xi = 14^\circ.42 - 2^\circ.75 \sin^{\frac{7}{4}} \phi$
Spoerer	$\xi = 8.55 + 5.80 \cos \phi$
Maunder	$\xi = 12.43 + 2.01 \cos^2 \phi$
Dunér	$\xi = 10.60 + 4.21 \cos^2 \phi$
Halm	$\xi = 12.03 + 2.50 \cos^2 \phi$
Adams (mean of two series)	$\xi = 11.04 + 3.50 \cos^2 \phi$
Adams λ 4227	$\xi = 12.5 + 2.4 \cos^2 \phi$
Adams $H\alpha$	$\xi = 13.6 + 1.4 \cos^2 \phi$

Table 30.—Comparison of Rotation Results from Various Sources.

ϕ	Sun-spots.			Faculæ.	Calcium Flocculi.			Hydrogen Flocculi.	Reversing Layer.			λ 4227	$H\alpha$
	Carrington.	Spoerer.	Maunder.	Stratonoff.	Hale and Fox (Kenwood).	Fox.	Hale, Mount Wilson.	Mount Wilson.	Dunér.	Halm.	Adams, Two Series.	Adams.	Adams.
°	°	°	°	°	°	°	°	°	°	°	°	°	°
0	14.42	14.35	14.44	14.62	14.70	14.52	14.42	14.6	14.81	14.53	14.54	14.9	15.0
5	14.38	14.32	14.43	14.61	14.59	14.46	14.38	...	14.78	14.50	14.51	...	...
10	14.29	14.26	14.38	14.46	14.44	14.33	14.32	...	14.68	14.46	14.43	...	...
15	14.16	14.15	14.30	14.24	14.30	14.09	14.28	...	14.53	14.37	14.31	14.8	14.9
20	14.00	14.00	14.19	14.18	14.17	13.80	14.27	...	14.32	14.24	14.13	...	...
25	13.81	13.80	14.06	14.14	14.02	13.82	14.17	...	14.06	14.09	13.91	...	...
30	13.60	13.57	13.91	13.84	13.83	13.83	13.98	...	13.76	13.90	13.67	14.3	14.6
35	13.38	13.30	13.74	....	....	....	14.04	...	13.42	13.70	13.39	...	...
40	....	....	....	....	....	....	13.92	...	13.07	13.50	13.09	...	...
45	....	....	....	....	....	....	....	...	12.70	13.28	12.79	13.7	14.3
50	....	....	....	....	....	....	....	...	12.34	13.07	12.49	...	...
55	....	....	....	....	....	....	....	...	11.99	12.86	12.19	...	...
60	....	....	....	....	....	....	....	...	11.65	12.66	11.92	13.1	13.9
65	....	....	....	....	....	....	....	...	11.35	12.48	11.67	...	...
70	....	....	....	....	....	....	....	...	11.09	12.32	11.45	...	...
75	....	....	....	....	....	....	....	...	10.88	12.20	11.27	12.7	13.7

As has already been stated, my own 1908 observations agree closely with Dunér's in the higher latitudes, but are smaller and nearer Halm's values in the lower latitudes. In Table 31 I have taken simple means for the spot and flocculi results and compared them with the values obtained from my two series of observations on the reversing layer. They are shown graphically in Fig. 2.

TABLE 31.—SUMMARY OF ROTATION RESULTS FROM VARIOUS SOURCES.

ϕ	SPOTS.	FACULÆ.	FLOCCULI.	REVERSING LAYER.
°	°	°	°	°
0	14.40	14.62	14.55	14.54
5	14.38	14.61	14.48	14.51
10	14.31	14.46	14.36	14.43
15	14.20	14.24	14.22	14.31
20	14.06	14.18	14.08	14.13
25	13.89	14.14	14.00	13.91
30	13.69	13.84	13.88	13.67
35	13.47	....	13.81	13.39

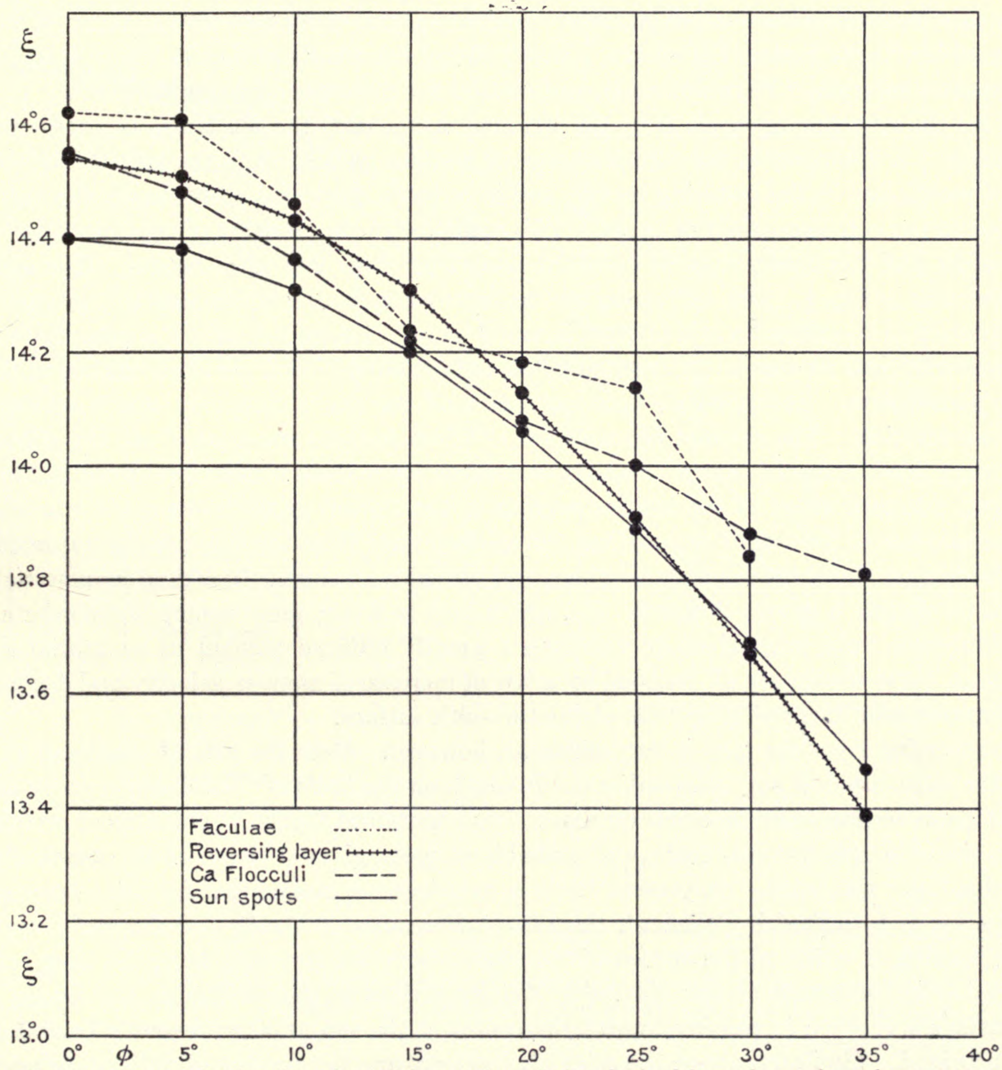


FIG. 2.—Curves showing the values of the angular velocity obtained from observations of sun-spots, faculæ, calcium flocculi, and reversing layer. Plotted from the results given in Table 31.

Attention has already been called by Mr. Hale to the comparatively small values of the angular velocity given by spots (19). The difference at the equator amounts to $0^\circ.2$ as compared with faculæ, flocculi, or reversing layer, and in view of the close accordance of the spot observations at this latitude the result is probably to be considered as genuine. Similar differences, as compared with faculæ and flocculi, are shown in higher latitudes by the results of Carrington and Spoerer, but the inclusion of Maunder's larger values in the mean conceals this effect. There seems to be a tendency for the reversing layer to give slightly larger values than the flocculi between latitudes 0° and 20°. This may be due, as Mr. Hale has suggested in his discussion, to the possibility that the faculæ and flocculi retain the velocities of the lower levels from which they rise, but the differences are small and hardly sufficient to warrant a definite conclusion, especially in view of the considerable discordance among the separate flocculi determinations.

Another most interesting consideration is whether there appears to be any difference in the law of the equatorial acceleration in the results given by the observations of the various objects on the sun's surface. This is made especially important by the discovery of the remarkable differences in velocity shown by spectroscopic observations of the hydrogen lines $H\alpha$ and λ 4227 of calcium, as well as observations of the hydrogen flocculi with the spectroheliograph. Unfortunately, the results for both faculæ and flocculi are necessarily very uncertain above 30° of latitude. Accordingly, in order to secure as accurate a comparison as seems possible with the material available, I have reduced the results for faculæ, flocculi, $H\alpha$, and λ 4227, by a least-squares solution of Faye's formula, and plotted the corresponding results for every 5° of latitude. The values for the reversing layer are from the formula representing the combined values of the two series of observations. A difference in the rate of change of angular velocity with the latitude will be indicated by a lack of parallelism in the resulting curves, and in order to show this more clearly the values have all been reduced to the common origin of $14^\circ.50$. This necessitates the addition of constant quantities to the sun-spot results and the subtraction of constant quantities from the other results. The comparison is shown graphically in Fig. 3. One extrapolation has been made for the faculæ and the flocculi.

The inspection of these results is of interest in many ways. The spots and the faculæ give values which are practically identical throughout, a result which is to be expected from the close relation of these objects to the solar photosphere. Intermediate between these and the flocculi is λ 4227, which shows notably less equatorial acceleration. The calcium flocculi show still less, and $H\alpha$ the least of all, the differences in its case being very great indeed. Apart from the reversing layer these results are quite in harmony with the commonly accepted views of the relative heights of the various gases in the sun's atmosphere. The calcium flocculi, due to the bright reversals of the calcium lines H and K, are usually assumed to lie at a considerable distance above the sun's photosphere, and probably at a higher level than the material producing the blue line of calcium λ 4227. Similarly, $H\alpha$, which rises to a very great height in the solar atmosphere, gives in addition to very large absolute velocities a greatly reduced amount of equatorial acceleration. In other words, these results are all satisfied by a law of increase of angular velocity and decrease of equatorial acceleration with increasing altitude above the sun's surface.

For the reversing layer the case is very different, however. Here the rate of change of velocity with latitude is the most rapid of any observed, a result which on the basis of the reasoning given above would require that the reversing layer lie below the level of sun-spots and faculæ. This almost certainly can not be the case, since the spectrum of faculæ, and probably of spots, gives evidence of the presence of the ordinary reversing-layer spectrum. At present there is no adequate explanation for this apparent anomaly, but a suggestion is furnished by Wilsing's theoretical discussion of the law of the sun's rotation (21), a memoir the bearing of which on the motion of the strata above the reversing layer has been referred to by Mr. Hale (23). In the course of this discussion Wilsing arrives at the conclusion that owing to internal friction a surface is reached in passing toward the center of the sun at which essentially uniform angular velocity is attained. Similarly, above the solar photosphere another surface of uniform velocity is found, and between these two surfaces the motion is compared by Wilsing to that of "a stream flowing between

two fixed banks." On this basis it is evident that there would be a region at which the rate of change of angular velocity with latitude would be a maximum, and that on either side of this region the change would become less. Accordingly, if we may assume that the reversing layer corresponds to this region of most rapid change, we may expect, on the one hand, the spots and faculæ, which are nearer one of the surfaces of uniform velocity, and, on the other hand, λ 4227, the calcium flocculi, and *Hα*, whose level is nearer the other surface, to give less equatorial acceleration, the amount diminishing in the order named. The whole question is, however, extremely complex, the quantities concerned are small, except in the case of *Hα*, and the difficulties involved in the explanation of the differences in the values of the absolute velocities of rotation are correspondingly great. It will hardly be profitable to continue the discussion further until additional observational material has placed the reality of these differences upon a more certain basis.

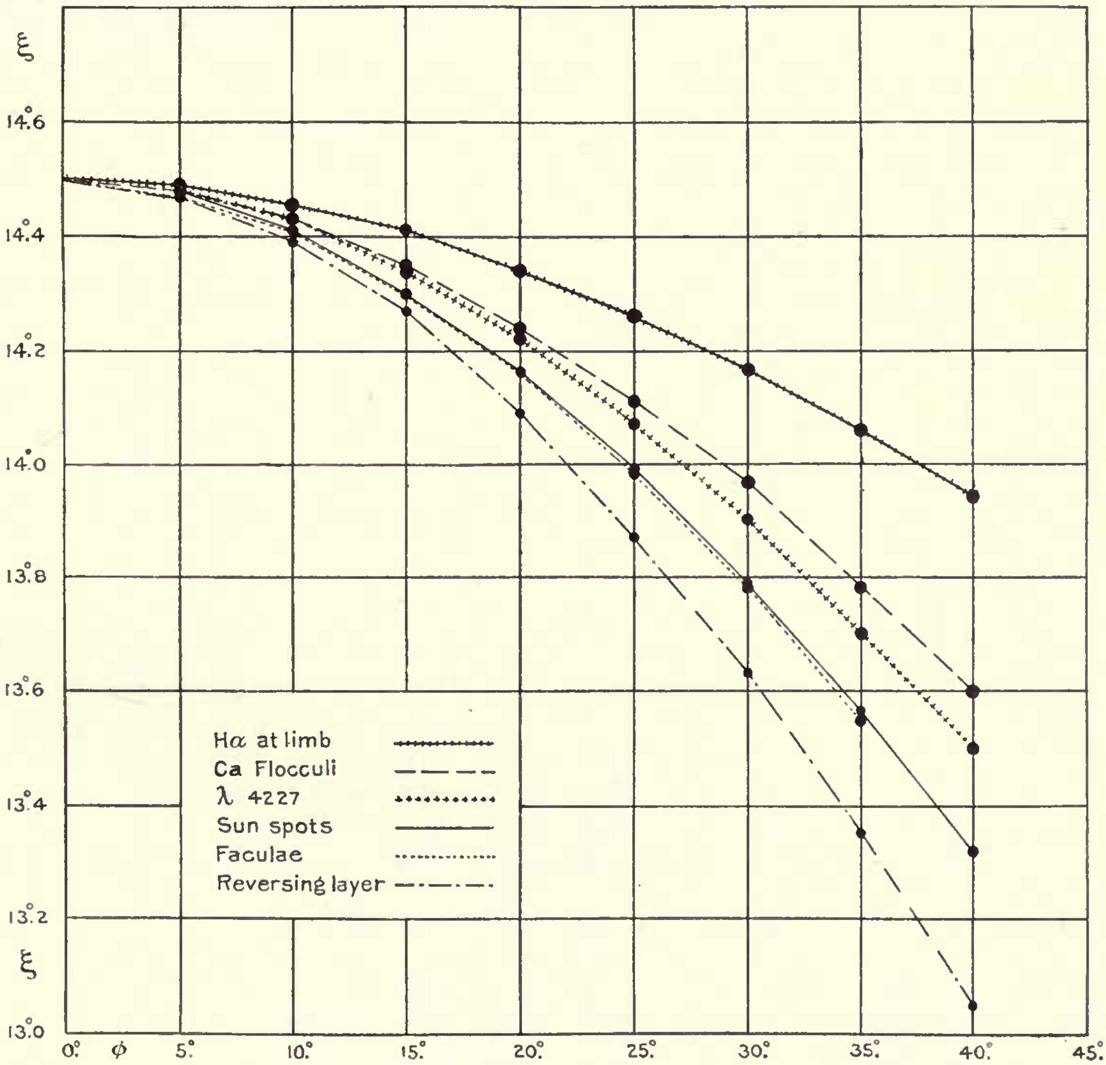


FIG. 3.—Curves showing variation of angular velocity with latitude for sun-spots, faculæ, calcium flocculi, reversing layer, λ 4227, and *Hα*. To facilitate comparison the curves are all reduced to the common origin of 14°.50. Differences in the amount of equatorial acceleration are indicated by lack of parallelism in the curves.

16. A Case of Large Proper Motion in the Reversing Layer.

Reference was made at an earlier point in this discussion to the disturbing effect of proper motions in the reversing layer upon determinations of rotational velocity. Such motions have frequently been observed in the neighborhood of sun-spots, particularly across the faculæ bordering the penumbra, but it appears from the observations described below that they may extend to great distances from spots as well.

On September 15, 1908, two spots of considerable size were nearing the west limb of the sun. The larger of the two spots was at 11° north latitude, the other at 6° south latitude. Photographs taken with the spectroheliograph through the *a* line of hydrogen had shown both spots to be surrounded by immense regions of disturbance, with the filaments nearest the spots giving some evidence of vortical motion. Observations made by Mr. Hale during the passage of the spots across the sun's disk had indicated opposite directions of polarization for the components of the double lines in the spot spectra, thus pointing to opposite directions of rotation in the two spots, provided vortical motion were involved. The region between

Table 32.—Observations of Proper Motion in the Reversing Layer.

Plate ω 173. 1908, Sept. 15, $6^h\ 5^m$ G. M. T. Measured by L. on T. Distance from Limb 1.5 mm. Quality, good.

		$p-P$	π	ϕ	η	sec η
	°	°	°	°	°	
☉	172.5	12.8	14.7	75.3	29.6	1.150
☉−☊	98.0	26.4	27.2	62.8	14.4	1.032
P	−24.4	44.8	45.3	44.7	10.1	1.016
D	7.2	59.9	60.2	29.8	8.3	1.010
Diameter	170.6 mm	74.9	75.1	14.9	7.4	1.008
Factor	1.018	89.9	90.0	0.0	7.2	1.008

λ	$\phi = 0\overset{\circ}{.}0$				$\phi = 14\overset{\circ}{.}9$				$\phi = 29\overset{\circ}{.}8$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4208.766	0.165	1.805	1.942	13.79	0.162	1.775	1.907	14.01	0.140	1.535	1.655	13.54
4210.494	0.165	1.805	1.942	13.79	0.164	1.794	1.926	14.14	0.140	1.535	1.655	13.54
4216.136	0.162	1.770	1.907	13.54	0.162	1.768	1.900	13.95	0.140	1.533	1.653	13.52
4220.509	0.163	1.779	1.916	13.60	0.163	1.777	1.909	14.02	0.140	1.531	1.651	13.51
4222.382	0.165	1.798	1.935	13.74	0.162	1.766	1.898	13.94	0.140	1.530	1.650	13.50
4233.328	0.164	1.775	1.912	13.57	0.163	1.769	1.901	13.96	0.142	1.541	1.661	13.59
4236.112	0.164	1.775	1.912	13.57	0.163	1.768	1.900	13.95	0.142	1.541	1.661	13.59
4246.251	0.165	1.783	1.920	13.63	0.163	1.766	1.898	13.94	0.140	1.518	1.638	13.40
4250.287	0.165	1.781	1.918	13.62	0.161	1.741	1.873	13.76	0.141	1.528	1.648	13.48
4250.945	0.164	1.770	1.907	13.54	0.163	1.762	1.894	13.91	0.140	1.517	1.637	13.39
4254.505	0.167	1.802	1.939	13.77	0.160	1.729	1.861	13.67	0.137	1.483	1.603	13.11
4257.815	0.162	1.747	1.884	13.38	0.163	1.760	1.892	13.90	0.139	1.504	1.624	13.29
	$\phi = 44\overset{\circ}{.}7$				$\phi = 62\overset{\circ}{.}8$				$\phi = 75\overset{\circ}{.}3$			
4208.766	0.104	1.146	1.242	12.41	0.059	0.660	0.729	11.32	0.029	0.363	0.397	11.11
4210.494	0.104	1.146	1.242	12.41	0.058	0.650	0.719	11.17	0.028	0.351	0.385	10.77
4216.136	0.105	1.155	1.241	12.40	0.059	0.660	0.729	11.32	0.028	0.351	0.385	10.77
4220.509	0.106	1.163	1.259	12.57	0.058	0.645	0.714	11.09	0.028	0.351	0.385	10.77
4222.382	0.104	1.142	1.238	12.36	0.059	0.655	0.724	11.24	0.030	0.373	0.407	11.39
4233.328	0.107	1.168	1.264	12.62	0.059	0.655	0.724	11.24	0.029	0.359	0.393	11.00
4236.112	0.107	1.167	1.263	12.61	0.060	0.665	0.734	11.40	0.029	0.359	0.393	11.00
4246.251	0.105	1.146	1.242	12.40	0.058	0.644	0.713	11.07	0.028	0.346	0.380	10.63
4250.287	0.104	1.135	1.231	12.30	0.058	0.643	0.712	11.06	0.028	0.346	0.380	10.63
4250.945	0.107	1.165	1.261	12.59	0.059	0.653	0.722	11.21	0.029	0.358	0.392	10.97
4254.505	0.106	1.154	1.250	12.48	0.058	0.642	0.711	11.04	0.028	0.345	0.379	10.60
4257.815	0.104	1.131	1.227	12.26	0.060	0.663	0.732	11.37	0.028	0.344	0.378	10.58

the spots was in an extremely chaotic state, owing probably to the intermingling of the disturbances centered about the two spots.

Four plates of the region of the spectrum near λ 4227 were taken on this date with the rotation apparatus at latitudes ranging from 0° to 75°, in steps differing by 15°. Accordingly, for one of the settings at 0°, a point 6° north of one of the spots fell upon the slit of the instrument; for another, at latitude 14°.9, a point 4° north of the other spot. In the first case the point fell considerably east of the spot as well. All of the plates were taken in connection with the investigation of the motion of the calcium vapor giving rise to λ 4227, and their density was made greater than usual in order to facilitate settings upon this broad and hazy line.

As soon as the measurement of the plates was begun, it was found that the values at latitudes 0° and 14°.9 were very discordant, when compared with those regularly obtained. Therefore a list of lines suitable for measurement was selected, since the regular list could not be used on account of the great density of the negatives, and the plates were investigated separately. The results for these lines are shown in detail in Table 32. The results for λ 4227 are given in Table 33.

Table 32.—Observations of Proper Motion in the Reversing Layer—Continued.

Plate ω 174. 1908, Sept. 15, $6^h\ 5^m$ G. M. T. Measured by L. on T. Distance from Limb 1.5 mm. Quality, good.

[Plate constants are the same as for ω 173.]

λ	$\phi = 0^\circ.0$				$\phi = 14^\circ.9$				$\phi = 29^\circ.8$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4208.766	0.161	1.762	1.899	13.47	0.160	1.750	1.882	13.83	0.140	1.543	1.663	13.60
4210.494	0.162	1.772	1.909	13.55	0.161	1.761	1.893	13.91	0.141	1.553	1.673	13.69
4216.136	0.161	1.757	1.894	13.45	0.162	1.770	1.902	13.97	0.141	1.543	1.663	13.60
4220.509	0.162	1.766	1.903	13.51	0.160	1.745	1.877	13.79	0.140	1.530	1.653	13.52
4222.382	0.163	1.776	1.913	13.58	0.162	1.766	1.898	13.94	0.142	1.551	1.671	13.67
4233.328	0.162	1.758	1.895	13.45	0.161	1.749	1.881	13.82	0.142	1.538	1.658	13.56
4236.112	0.162	1.757	1.894	13.44	0.162	1.759	1.891	13.89	0.142	1.538	1.658	13.56
4246.251	0.162	1.752	1.889	13.41	0.161	1.743	1.875	13.77	0.142	1.537	1.657	13.56
4250.287	0.161	1.740	1.877	13.33	0.161	1.740	1.872	13.75	0.140	1.515	1.635	13.38
4250.945	0.166	1.794	1.931	13.71	0.162	1.749	1.881	13.82	0.141	1.525	1.645	13.46
4254.505	0.162	1.749	1.886	13.39	0.160	1.729	1.861	13.67	0.142	1.536	1.656	13.55
4257.815	0.163	1.758	1.895	13.45	0.162	1.748	1.880	13.81	0.141	1.525	1.645	13.46
	$\phi = 44^\circ.7$				$\phi = 62^\circ.8$				$\phi = 75^\circ.3$			
4208.766	0.103	1.134	1.230	12.29	0.059	0.659	0.728	11.31	0.030	0.374	0.408	11.41
4210.494	0.102	1.124	1.220	12.19	0.059	0.659	0.728	11.31	0.030	0.374	0.408	11.41
4216.136	0.105	1.141	1.237	12.36	0.059	0.658	0.727	11.29	0.030	0.373	0.407	11.39
4220.509	0.103	1.131	1.227	12.26	0.060	0.668	0.737	11.45	0.030	0.373	0.407	11.39
4222.382	0.104	1.141	1.237	12.36	0.060	0.668	0.737	11.45	0.030	0.373	0.407	11.39
4233.328	0.103	1.124	1.220	12.19	0.059	0.654	0.723	11.23	0.031	0.380	0.414	11.58
4236.112	0.106	1.159	1.255	12.54	0.060	0.664	0.733	11.38	0.032	0.393	0.427	11.95
4246.251	0.103	1.122	1.218	12.17	0.061	0.675	0.744	11.56	0.031	0.380	0.414	11.58
4250.287	0.104	1.132	1.228	12.26	0.060	0.663	0.732	11.37	0.029	0.357	0.391	10.94
4250.945	0.105	1.141	1.237	12.36	0.060	0.663	0.732	11.37	0.029	0.357	0.391	10.94
4254.505	0.105	1.141	1.237	12.36	0.059	0.653	0.722	11.21	0.032	0.392	0.426	11.92
4257.815	0.105	1.141	1.237	12.36	0.060	0.663	0.732	11.37	0.030	0.369	0.403	11.27

TABLE 32.—OBSERVATIONS OF PROPER MOTION IN THE REVERSING LAYER—Continued.

Plate ω 175. 1908, Sept. 15, 7^h 10^m G. M. T. Measured by L. on T. Distance from Limb 1.5 mm. Quality, good.
[Plate constants are the same as for ω 173.]

λ	$\phi = 0\overset{\circ}{.}0$				$\phi = 14\overset{\circ}{.}9$				$\phi = 29\overset{\circ}{.}8$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4208.766	0.168	1.836	1.973	14.01	0.163	1.785	1.917	14.08	0.141	1.547	1.667	13.64
4210.494	0.166	1.815	1.952	13.86	0.164	1.794	1.926	14.15	0.141	1.546	1.666	13.63
4216.136	0.166	1.813	1.950	13.84	0.163	1.782	1.914	14.06	0.142	1.553	1.673	13.69
4220.509	0.166	1.812	1.949	13.84	0.164	1.789	1.921	14.11	0.141	1.543	1.663	13.61
4222.382	0.168	1.830	1.967	13.96	0.164	1.788	1.920	14.10	0.142	1.551	1.671	13.67
4233.328	0.167	1.813	1.950	13.84	0.164	1.782	1.914	14.06	0.142	1.546	1.666	13.63
4236.112	0.169	1.833	1.970	13.99	0.165	1.791	1.923	14.13	0.142	1.544	1.664	13.63
4246.251	0.172	1.855	1.992	14.14	0.164	1.774	1.906	14.00	0.142	1.542	1.662	13.62
4250.287	0.166	1.794	1.931	13.71	0.163	1.762	1.894	13.91	0.142	1.539	1.659	13.57
4250.945	0.167	1.803	1.940	13.77	0.164	1.772	1.904	13.99	0.142	1.537	1.657	13.56
4254.505	0.168	1.813	1.950	13.84	0.164	1.771	1.903	13.98	0.143	1.546	1.666	13.63
4257.815	0.167	1.802	1.939	13.77	0.165	1.781	1.917	14.05	0.142	1.536	1.656	13.55
	$\phi = 44\overset{\circ}{.}7$				$\phi = 62\overset{\circ}{.}8$				$\phi = 75\overset{\circ}{.}3$			
4208.766	0.102	1.123	1.219	12.18	0.058	0.650	0.719	11.17	0.028	0.349	0.383	10.72
4210.494	0.101	1.113	1.209	12.08	0.060	0.669	0.738	11.46	0.027	0.339	0.373	10.44
4216.136	0.102	1.122	1.218	12.17	0.059	0.659	0.728	11.31	0.028	0.349	0.383	10.72
4220.509	0.102	1.121	1.217	12.16	0.058	0.648	0.717	11.14	0.027	0.338	0.372	10.41
4222.382	0.102	1.120	1.216	12.14	0.058	0.648	0.717	11.14	0.028	0.348	0.382	10.69
4233.328	0.103	1.121	1.217	12.16	0.059	0.653	0.722	11.21	0.028	0.346	0.380	10.63
4236.112	0.103	1.121	1.217	12.16	0.059	0.653	0.722	11.21	0.027	0.336	0.370	10.35
4246.251	0.102	1.110	1.206	12.05	0.058	0.642	0.711	11.04	0.027	0.335	0.369	10.32
4250.287	0.102	1.110	1.206	12.05	0.058	0.642	0.711	11.04	0.028	0.346	0.380	10.63
4250.945	0.104	1.130	1.226	12.24	0.057	0.632	0.701	10.89	0.028	0.346	0.380	10.63
4254.505	0.104	1.130	1.226	12.24	0.060	0.663	0.732	11.37	0.028	0.346	0.380	10.63
4257.815	0.102	1.108	1.204	12.03	0.057	0.630	0.699	10.86	0.027	0.335	0.369	10.32

Plate ω 176. 1908, Sept. 15, 7^h 10^m G. M. T. Measured by L. on T. Distance from Limb 1.5 mm. Quality, good.
[Plate constants are the same as for ω 173.]

λ	$\phi = 0\overset{\circ}{.}0$				$\phi = 14\overset{\circ}{.}9$				$\phi = 29\overset{\circ}{.}8$			
	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ	Δ	v	$v+v_1$	ξ
		km	km	°		km	km	°		km	km	°
4208.766	0.166	1.816	1.953	13.87	0.163	1.784	1.916	14.08	0.142	1.555	1.675	13.70
4210.494	0.165	1.805	1.942	13.79	0.163	1.783	1.915	14.07	0.143	1.565	1.685	13.79
4216.136	0.166	1.812	1.949	13.84	0.163	1.780	1.912	14.04	0.142	1.553	1.673	13.69
4220.509	0.166	1.811	1.948	13.83	0.164	1.789	1.921	14.11	0.141	1.542	1.662	13.60
4222.382	0.167	1.820	1.957	13.89	0.163	1.777	1.909	14.02	0.142	1.551	1.671	13.67
4233.328	0.166	1.803	1.940	13.77	0.163	1.771	1.903	13.98	0.142	1.544	1.664	13.61
4236.112	0.167	1.809	1.946	13.82	0.165	1.790	1.922	14.12	0.142	1.543	1.663	13.61
4246.251	0.168	1.817	1.954	13.88	0.163	1.768	1.900	13.96	0.143	1.552	1.672	13.68
4250.287	0.168	1.816	1.953	13.87	0.163	1.763	1.895	13.92	0.142	1.538	1.658	13.56
4250.945	0.169	1.824	1.961	13.92	0.164	1.771	1.903	13.98	0.142	1.537	1.657	13.56
4254.505	0.168	1.813	1.950	13.85	0.163	1.759	1.891	13.89	0.143	1.546	1.666	13.63
4257.815	0.167	1.802	1.939	13.77	0.162	1.748	1.880	13.81	0.142	1.536	1.656	13.55
	$\phi = 44\overset{\circ}{.}7$				$\phi = 62\overset{\circ}{.}8$				$\phi = 75\overset{\circ}{.}3$			
4208.766	0.102	1.125	1.221	12.20	0.059	0.662	0.731	11.35	0.028	0.351	0.385	10.77
4210.494	0.104	1.146	1.242	12.40	0.060	0.672	0.741	11.51	0.029	0.363	0.397	11.11
4216.136	0.103	1.134	1.230	12.28	0.060	0.671	0.740	11.49	0.030	0.374	0.408	11.41
4220.509	0.102	1.121	1.217	12.16	0.059	0.660	0.729	11.32	0.029	0.359	0.393	11.00
4222.382	0.102	1.120	1.216	12.14	0.060	0.669	0.729	11.32	0.028	0.348	0.382	10.69
4233.328	0.103	1.127	1.223	12.22	0.059	0.656	0.725	11.26	0.029	0.347	0.381	10.66
4236.112	0.103	1.126	1.222	12.20	0.058	0.644	0.713	11.07	0.030	0.357	0.391	10.94
4246.251	0.102	1.114	1.210	12.09	0.058	0.643	0.712	11.05	0.028	0.346	0.380	10.63
4250.287	0.103	1.121	1.217	12.16	0.060	0.663	0.732	11.37	0.029	0.346	0.380	10.63
4250.945	0.102	1.110	1.206	12.05	0.060	0.662	0.731	11.35	0.030	0.356	0.390	10.91
4254.505	0.103	1.120	1.216	12.15	0.059	0.652	0.721	11.20	0.028	0.345	0.379	10.60
4257.815	0.102	1.110	1.206	12.05	0.058	0.642	0.711	11.03	0.028	0.345	0.379	10.60

The combination of these results gives the values of $v + v_1$ shown in Table 33, the normal values in each case being added for comparison. The latter are from the 1908 observations.

TABLE 33.—PROPER MOTION IN THE REVERSING LAYER.

ϕ	REVERSING LAYER.		λ 4227	
	DISTURBED.	NORMAL.	DISTURBED.	NORMAL.
°	km	km	km	km
0.0	1.930	2.063	2.01	2.12
14.9	1.899	1.944	1.97	2.02
29.8	1.666	1.669	1.73	1.75
44.7	1.240	1.289	1.31	1.36
62.8	0.724	0.740	0.84	0.82
75.3	0.389	0.387	0.48	0.49

At latitude 30° and above that point it is seen that the results obtained from these plates agree fairly well with the normal, although the differences at latitude 44°.7 are unusually large. At 14°.9, however, there is a difference of 0.045 km for the reversing layer, and at 0° a difference of 0.133 km, the values given by these plates being the smaller. The results for λ 4227 are very similar. In other words, proper motions of the reversing layer toward the observer at the west limb of the sun of 0.05 km in one case and 0.13 km in the other are indicated, if we assume, as seems altogether probable, that the entire difference is due to the disturbances near the west limb. The direction of motion at the first of these points, 14°.9, is in accordance with what would be expected if vortical motion occurred in the northern spot in the direction indicated by polarization observations and photographs with the spectroheliograph. These point to a direction of motion counter-clockwise as seen from above. Accordingly, at a point north of this spot, the motion would be toward the observer, and the rotational velocity reduced.

In the case of the second spot an opposite direction of motion is indicated by polarization observations, and we should accordingly expect, for a point north of this spot, motion away from the observer. This is opposed to what is found. It is doubtful, however, whether this lack of agreement is more than apparent. The slit setting in this case was 6° away from the spot, and considerably east of it as well. It also fell on a greatly disturbed region between the two spots, where it is by no means certain that any well-defined direction of motion would predominate. In any case it is clear that a large amount of observational material would be necessary to settle the question of vortical motion about spots by means of spectroscopic observations of the reversing layer, since the quantities involved are considerably smaller than would be expected, provided any definite motion of this sort, in which the reversing layer shares, actually exists.

The important fact as bearing on observations of the rotation of the sun is that large areas on the solar surface may be affected with proper motions of such size as to introduce very serious errors into the results when the areas happen to fall near the sun's limb. It seems very probable that the regions of greatest disturbance, where the proper motions would be largest, are associated with spots; but observations with the spectroheliograph have shown that such disturbances may also exist where there are no spots. Furthermore, an investigation by myself of the small pressure displacements at the sun's limb has led to the conclusion that regions are sometimes found near the center of the sun in which there are ascending currents in the reversing layer, showing motions of as much as 0.2 km. It is very probable that these regions may have a lateral drift as well, in which case they would affect seriously observations of the rotation of the sun.

The possible bearing of these results on the two series of observations for 1906–1907 and 1908 has already been noted. Although we should expect differences arising from this cause to be greatest in the zones of spot activity, yet the existence of a few cases of proper motion in the higher latitudes might well affect the rotational values materially, since the observations are not sufficiently numerous to eliminate their effect.

A similar cause may perhaps account in part for the difference found by Halm between the two series of observations, 1901–1902 and 1903. In such a case the differences would represent rather the excess of the

effect of systematic proper motions in one series over that for the other than any real variation in the sun's rate of rotation. The year 1903 was characterized by much greater spot activity than were the two preceding years. Accordingly, it might well happen that if the spots were accompanied by large areas of disturbance, and the points observed did not chance to be symmetrically distributed about them, the average results might be affected by systematic differences. The whole question is doubtful, however, and the main inference to be drawn is that in taking observations to determine the rotation of the sun, regions as free as possible from disturbances should be selected and as large a number of observations as possible be made, in order to reduce the effect of systematic proper motions.

17. Determination of the Solar Rotation with the *a* Line of Hydrogen.

The details of the observations on the *a* line of hydrogen at the sun's limb and at points averaging 3 mm inside the limb have been given in Tables 15–18 in Part I of this discussion. If we collect the values and form normal places of latitude for the two series, we obtain Table 34.

Table 34.—Mean Results for the *a* Line of Hydrogen.

At Limb.				3 mm Inside Limb.			
ϕ	$v+v_1$	ξ	Period.	ϕ	$v+v_1$	ξ	Period.
°	km	°	days	°	km	°	days
0.5	2.14	15.2	23.7	0.4	2.11	15.0	24.0
14.6	2.03	14.9	24.2	14.6	2.00	14.7	24.5
29.5	1.78	14.5	24.8	29.8	1.73	14.1	25.5
44.6	1.41	14.0	25.7	45.0	1.38	13.8	26.1
59.9	0.95	13.5	26.7	60.3	0.90	13.0	27.7
75.0	0.52	14.2	25.4	75.5	0.47	13.3	27.1

A comparison of the results in Table 34 shows that the rate of change of the motion is very rapid inward from the limb, and that the points nearer the edge give not only larger absolute values, but also less change of velocity with change of latitude. An effect of this sort would seem very probable from the consideration that the level of effective absorption for points near the limb in the case of an element like hydrogen is probably decidedly higher than that for points inside the limb. Direct evidence of this, although not of very high weight, was furnished by the results obtained from some plates taken so close to the limb that upon two of them the bright chromospheric line was shown. These plates gave very large values throughout, and essentially no evidence of change of angular velocity with latitude.

Table 35.—Comparison of Results for *a* Line of Hydrogen with those for Reversing Layer.

ϕ	*Ha* at Limb.			*Ha* 3 mm Inside Limb.			Reversing Layer.		
	$v+v_1$	ξ	Period.	$v+v_1$	ξ	Period.	$v+v_1$	ξ	Period.
°	km	°	days	km	°	days	km	°	days
0.5	2.14	15.2	23.7	2.11	15.0	24.0	2.06	14.6	24.6
14.6	2.03	14.9	24.2	2.00	14.7	24.5	1.95	14.3	25.2
29.5	1.78	14.5	24.8	1.73	14.1	25.5	1.67	13.7	26.4
44.6	1.41	14.0	25.7	1.39	13.8	26.0	1.29	12.9	27.9
59.9	0.95	13.5	26.7	0.92	13.0	27.8	0.81	11.5	31.3
75.0	0.52	14.2	25.4	0.48	13.3	27.1	0.40	10.9	33.1

In order to compare the results of the two series on the *a* line of hydrogen with each other and with those given by the reversing layer, the values in Table 34 are reduced to the same latitude and collected in Table 35 along with the reversing layer results. The latter are from the 1908 observations.

An inspection of the results in Table 35 leads to two important conclusions. First, that the absolute velocity of rotation given by *Hα* is much higher than that found for the reversing layer. Second, that the law of change of angular velocity with latitude is quite different, the velocity being more nearly uniform, or the equatorial acceleration less, than in the case of the reversing layer.

As has been stated previously, it seems probable that the explanation of these results is to be found in the comparatively high level occupied by hydrogen gas in the sun's atmosphere. The change of angular velocity with latitude which, as we have seen, appears to be most rapid for the reversing layer, sun-spots, and faculæ, is almost certainly connected to some extent with the effects of internal friction. This friction no doubt decreases outward from the photosphere, with the result that for the higher gases the tendency is toward a more nearly uniform rate of rotation in all latitudes. Similarly, as the effect of friction is reduced, the higher gases tend to acquire greater velocities, the tendency toward orbital motion gradually becoming stronger. It would of course be necessary to go to immense distances from the sun, certainly beyond the corona, before the motion could in any sense be considered truly orbital, but a tendency in this direction might well begin at a comparatively low level. It is of interest to note in this connection that Campbell's result for the rotation of the corona indicates a very short period. Thus Campbell writes (22):

> The difference of the determinations for the E. and W. sides is 0.11 t.m. (Ångström), corresponding to a relative velocity in the line of sight for the two sides of 6.2 km, and a rotational velocity of 3.1 km per second. However, I regard this last result as subject to a possible error of at least ± 2 km per second, partly on account of unavoidable errors of observation, but principally on account of the character of the bright line.

A linear rotational velocity of 3.2 km corresponds to a daily angular motion of about 22°.7, or to a period of rotation of 15.9 days. It seems probable from the *Hα* results that at the level of even the lowest parts of the corona very little equatorial acceleration would be found.

The marked difference in the behavior of *Hα* at the sun's limb as compared with the violet lines of the hydrogen series makes it probable that a difference in the level of effective absorption is involved. Accordingly, I have made a few attempts to measure the rotational velocity given by the *Hγ* line. The results appear to indicate that *Hγ* gives values averaging about 0.05 km less than *Hα*, but they are of extremely low weight on account of the difficulty of measurement of this line. The recent studies by Hale and Ellerman of the hydrogen flocculi photographed with the different lines of the hydrogen series would indicate that some such effect might be expected (23).

18. Determination of the Solar Rotation with λ 4227 of Calcium.

The details of the observations on the line λ 4227 of calcium and summaries of the results are given in Tables 19 and 20 of Part I. If we combine the values about normal points of latitude, we obtain the results found in Table 36. The reversing layer values from the observations of 1908 are added for comparison.

Table 36.—Comparison of Results for λ 4227 of Calcium with those for Reversing Layer.

ϕ	λ 4227			Reversing Layer.		
	$v+v_1$	ξ	Period.	$v+v_1$	ξ	Period.
°	km	°	days	km	°	days
0.4	2.12	15.1	23.8	2.06	14.6	24.6
15.0	2.02	14.8	24.3	1.94	14.3	25.2
29.9	1.75	14.3	25.2	1.67	13.6	26.4
44.9	1.36	13.6	26.5	1.29	12.9	28.0
60.0	0.88	12.5	28.8	0.81	11.5	31.3
74.8	0.49	13.3	27.1	0.40	10.9	33.0

These results indicate that the calcium gas producing λ 4227, like hydrogen, moves more rapidly than the reversing layer, and shows less change of velocity with increasing latitude. The differences are less,

however, than for hydrogen near the limb, and approximately equal to those for hydrogen taken at a distance of 3 mm inside the limb.

An investigation of two calcium lines in the less refrangible part of the spectrum has been made by Pérot with interference apparatus (17). Preliminary values of the angular velocity given by him are as follows:

λ	$\phi = 0°$	$\phi = 45°.7$
5349.6	15.1	14.2
6122.4	14.7	14.2
Mean	14.9	14.2

At the equator these results are identical with those obtained here for λ 4227, but at 45° they are considerably larger. They may, of course, be modified considerably by more complete results, but it seems doubtful whether the entire difference will disappear. If it persists, it would seem to indicate a higher average level for these lines than for λ 4227. The broad wings of the latter line point to a region of considerable density and consequently of low level for their origin, but there can be but little doubt that the central portion of the line rises to a considerable altitude. Moreover, the size of pressure displacements found for the two less refrangible lines at the sun's limb would appear to argue against a very high level origin (24). All three of the lines are found in the spectrum of the chromosphere.

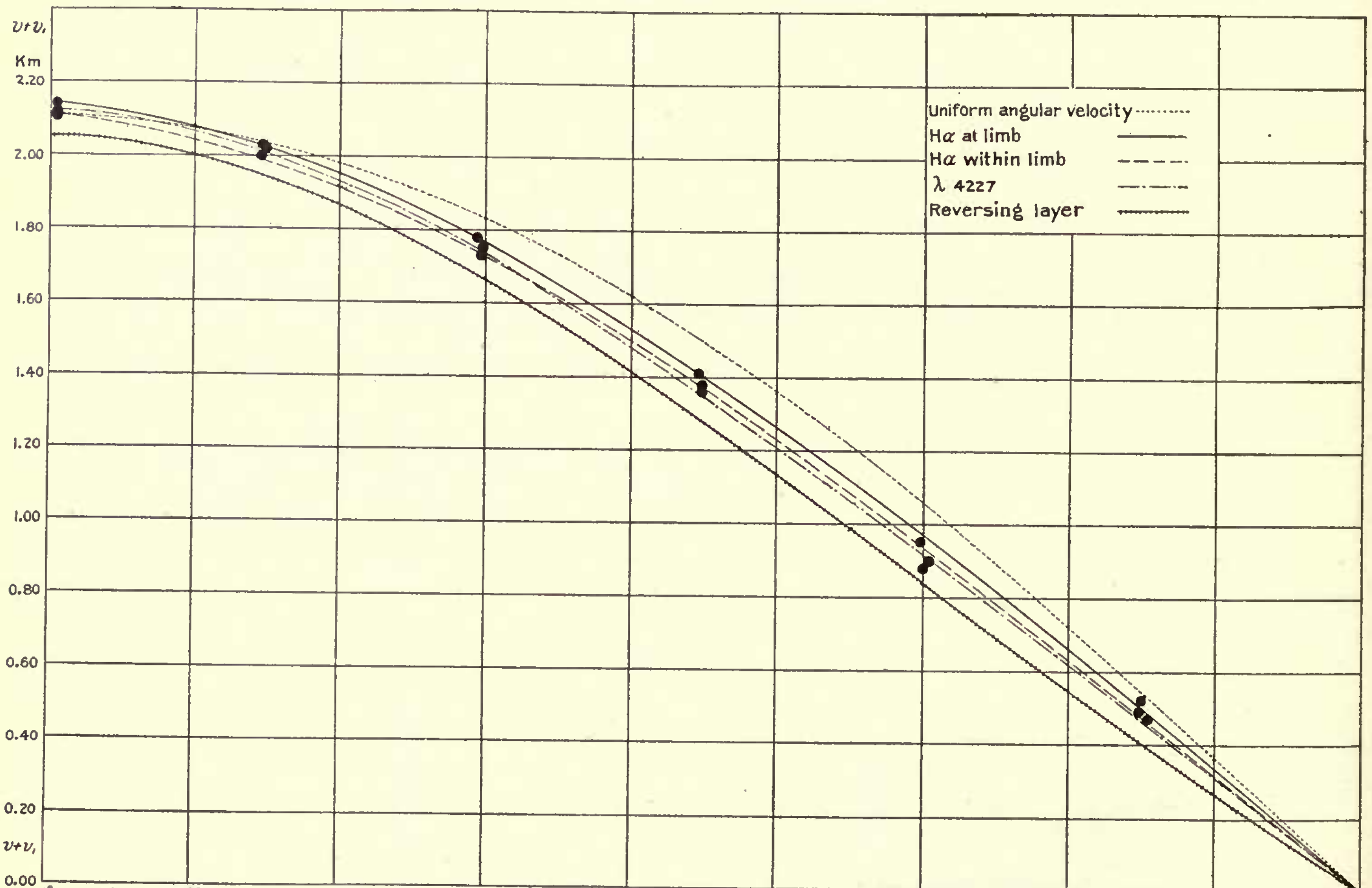


FIG. 4. — Variation of radial velocity with heliographic latitude for the different lines observed. The curve for the reversing layer is from the mean results for the two series of observations. The radial velocity curve of a body rotating uniformly with a motion of 15°.0 a day is added for comparison.

19. Comparison of Results from all the Lines Investigated.

A remarkable feature of the results for λ 4227 and the two series on the *a* line of hydrogen is the sudden increase in angular velocity between 60° and 75° of latitude. Too much stress should perhaps not be laid upon this, since in high latitudes the angular velocity is extremely sensitive to small differences in linear velocity; and with lines as difficult of measurement as these the entire effect could readily be laid to this source. A change of 0.018 km at 75°, for example, would reduce a value of ξ of 14°.0 to 13°.5. A similar effect, however, was found for the lines of lowest level in the reversing layer, the lines of lanthanum and cyanogen giving exceptionally large deviations in the higher latitudes and in directions opposite to those found for these high-level lines. Accordingly, there seems to be a slight presumption in favor of the existence of some cause toward the pole of the sun which tends to make the deviations from the mean exceptionally large for such lines as give abnormal values.

The results for the two series of observations on *Ha*, for λ 4227, and for the reversing layer are shown graphically in Fig. 4. The fifth curve, indicated by a dotted line, represents the curve of linear velocity of a body rotating with the uniform angular velocity of 15°.0 a day. It is, of course, the ordinary cosine curve.

In conclusion, it will be of interest to give a graphical representation of the results found in this investigation for all the lines studied. Accordingly, I have collected the formulæ which represent the solution by least squares of the values of the angular velocity obtained for the reversing layer, *Ha*, and λ 4227, and

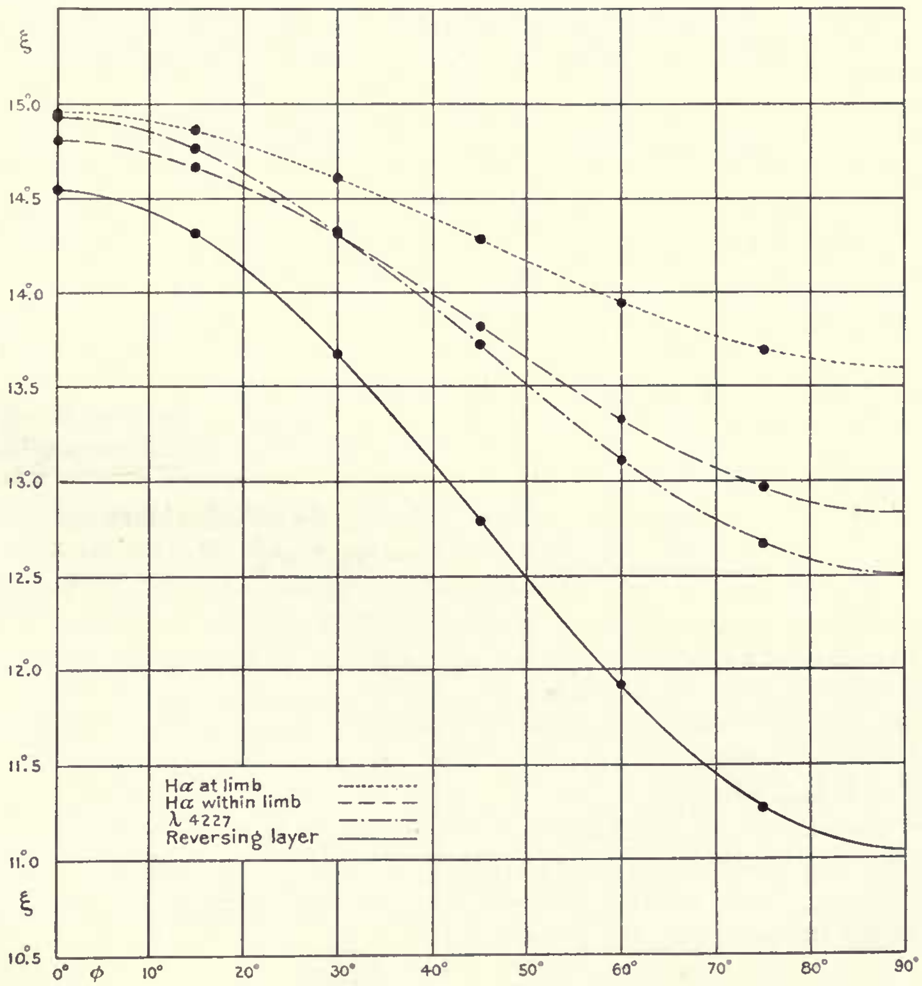


Fig. 5.— Curves representing the values of the angular velocity given by the empirical formulæ derived from the observations of *Ha*, λ 4227, and the reversing layer. For the last named the mean of the two series of observations is used.

have plotted the results for latitudes 0° to 75° in Fig. 5. The formula obtained from the mean results for the two series of observations has been employed for the reversing layer.

Reversing layer	$\xi = 11\overset{\circ}{.}04 + 3\overset{\circ}{.}50 \cos^2 \phi$
λ 4227	$\xi = 12.5 + 2.4 \cos^2 \phi$
Hα (within limb)	$\xi = 12.8 + 2.0 \cos^2 \phi$
Hα (limb)	$\xi = 13.6 + 1.4 \cos^2 \phi$

The numerical values of the angular velocity resulting from these equations are shown in Table 37 for every 15° of latitude. The values given for the pole are extrapolations based on the formulæ, and are, of course, subject to great uncertainty. An investigation of the region between latitude 75° and the pole undertaken with powerful apparatus would prove of great value in deciding many questions connected with the law of the sun's rotation.

Table 37.—Final Results for the Angular Velocity.

ϕ	Reversing Layer	λ 4227	*Hα* (inside limb)	*Hα* (limb)
°	°	°	°	°
0	14.54	14.9	14.8	15.0
15	14.31	14.8	14.7	14.9
30	13.67	14.3	14.3	14.6
45	12.79	13.7	13.8	14.3
60	11.92	13.1	13.3	13.9
75	11.27	12.7	13.0	13.7
Pole	(11.04)	(12.5)	(12.8)	(13.6)

20. General Summary.

The principal results of this investigation may be summarized as follows:

1. Two series of observations of the rotation of the sun made during 1906–1907 and 1908 give results agreeing closely with one another in latitudes 0° to 50°. Above 50° the 1908 observations give smaller values, the greatest difference being at 70° and amounting to about 0.039 km.

2. These differences are probably to be ascribed to small systematic errors in the earlier series of observations arising from the character of the solar image. They may possibly be ascribed in part to proper motions in the sun's reversing layer.

3. The evidence from these results is opposed to the existence of a variation in the sun's rate of rotation, unless the variation be of long period. Not only is there no appreciable difference between the two series of observations in the lower latitudes and the regions of greatest spot activity, but the agreement of the 1908 results with the values of Dunér make a variation during the interval very improbable.

4. Both series of observations agree in showing that the lines of different elements give different values of the rotational velocity. Lines of lanthanum and cyanogen give low velocities. These elements are known to lie at low levels in the solar atmosphere. Certain lines of manganese and iron give high velocities.

5. Lines which give systematically large or small values of the velocity appear to give the largest deviations from the mean in high latitudes.

6. The 1908 observations are satisfactorily represented by an empirical formula of the Faye type. The 1906–1907 observations show a tendency to systematic residuals with an equation of this form, and require the addition of another term for adequate representation. The combined results for the two series are very closely represented by the formula

$$\xi = 11\overset{\circ}{.}04 + 3\overset{\circ}{.}50 \cos^2 \phi$$

7. The fact that these observations, as well as those of Dunér and Halm, are satisfied by the Faye equation indicates that this represents with a considerable degree of accuracy the law of the sun's rotation to within 10° of the pole.

8. A comparison of the probable errors of the 1906–1907 observations with those of the 1908 series indicates a marked gain in accuracy for the latter. The results for both series appear to show a decided superiority for the photographic method over the visual so far as the degree of accuracy is concerned.

9. The displacements of the spectrum lines may be influenced seriously by proper motions of the reversing layer. These may be very large in the neighborhood of the disturbed regions which are usually associated with sun-spots. A value amounting to 0.2 km has been observed in one such case. It is most important that in observations of the rotation of the sun such regions should be avoided so far as possible.

10. A study of the *a* line of hydrogen shows that the gas producing this line moves at a much more rapid rate than the general reversing layer, and that the change of angular velocity with increasing latitude is very much less. At the equator the difference from the reversing layer is about 0°.5, while at 75° of latitude it amounts to over 2.5.

11. The results for the angular velocity obtained from *Ha* at a short distance inside the limb are appreciably smaller than those for the line at the limb. This is probably due to the lower average level of the gas involved in the formation of the line within the limb.

12. The line λ 4227 also gives decidedly larger values of the rotational velocity than do the lines of the reversing layer. The values are, however, smaller than for *Ha* at the sun's limb, and not far from equal to those for *Ha* within the limb. The equatorial acceleration is considerably greater for λ 4227 than for *Ha* at the limb.

13. The observations on both *Ha* and λ 4227 appear to indicate an increase in the angular velocity near the sun's pole. This is the converse of the result found for the lines of the reversing layer which give abnormally low values, and may perhaps be a genuine effect.

14. The comparison of the results on *Ha*, λ 4227, and the lines of the reversing layer shows that the observations are all satisfied by a law of rotation in which the velocity increases and the equatorial acceleration decreases with increasing distance outward from the sun's surface. The cause of this probably lies in the effects of friction in the lower portions of the solar atmosphere.

15. Comparison with the results for sun-spots, faculæ, and the calcium flocculi gives the following sequence in order of decreasing equatorial acceleration: spots and faculæ, λ 4227, calcium flocculi, *Ha*. The reversing layer, however, shows a greater amount of equatorial acceleration than any of these. If we assume, in accordance with Wilsing's theory, that there are two surfaces of constant angular velocity in the case of a rotating body such as the sun, it is possible that the reversing layer may lie in the position where the departure from this condition is a maximum. On this basis the spots and faculæ which lie near the inner surface of uniform velocity, and λ 4227, the calcium flocculi, and *Ha*, which lie nearer the outer surface, would all show less equatorial acceleration.

I am under the greatest obligation to Mr. Hale for many suggestions during the progress of this investigation and for a deep interest in it. Among the numerous advances in solar spectroscopy made possible by his design and construction of the tower telescope is to be included the marked gain in accuracy of the later series of observations of the rotation of the sun. I am also greatly indebted to Miss Lasby and to Miss Waterman, of the Computing Division, for aid in the measurement and reduction of the plates. The measurement of many of the plates has been carried out by Miss Lasby alone, and a large part of the great labor involved in their reduction and in the solution of the empirical formulæ has been divided between Miss Lasby and Miss Waterman.

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